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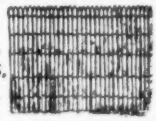

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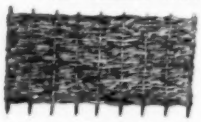

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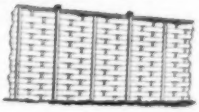

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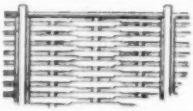

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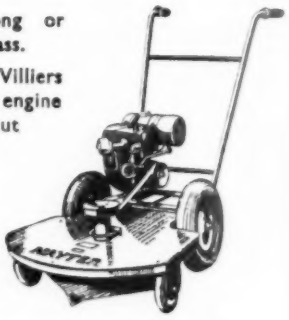

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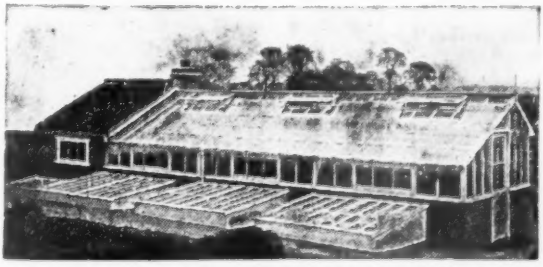

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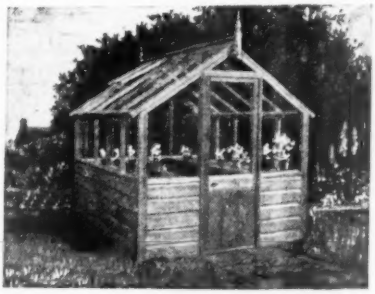

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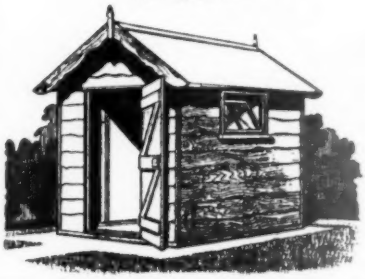

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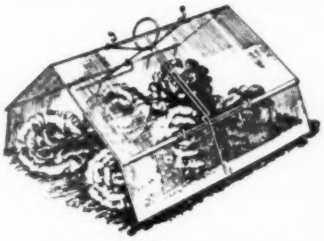

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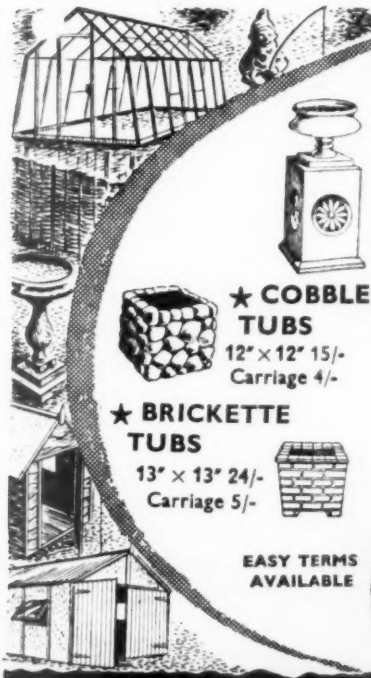

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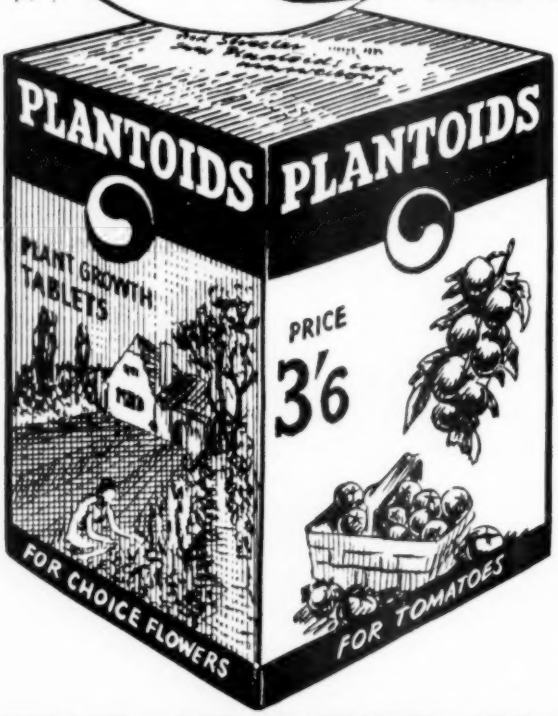

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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October 1953

THE SECRETARY'S PAGE

ANNOUNCEMENTS—OCTOBER AND NOVEMBER

Shows

TUESDAY, OCTOBER 6 12.30 P.M. to 6 P.M. WEDNESDAY, OCTOBER 7 10 A.M. to 5 P.M.	Fortnightly Show. Fruit and Vegetable Show.
TUESDAY, October 20 12 NOON to 6 P.M. WEDNESDAY, October 21 10 A.M. to 5 P.M.	Fortnightly Show. Tree and Shrub Competition.
TUESDAY, November 3 12 NOON to 6 P.M. WEDNESDAY, November 4 10 A.M. to 5 P.M.	Fortnightly Show. Floral Arrangement Competition for Amateurs. British National Carnation Society's Competition.
FRIDAY, November 6 1 P.M. to 7.30 P.M. SATURDAY, November 7 10 A.M. to 6 P.M. *Note :* R.H.S. tickets do not admit to this Show. *Admission :* November 6, 1–5 P.M. 4/–, 5–7.30 P.M. 2/6. November 7, 2/6.	National Chrysanthemum Society's Show.
TUESDAY, November 17 12 NOON to 6 P.M. WEDNESDAY, November 18 10 A.M. to 5 P.M.	Fortnightly Show.

Shows—*continued*

The British Beekeepers' Association's National Honey Show will be held in the Old Hall, Vincent Square, as follows : THURSDAY, October 15, 10 A.M. to 8 P.M.; FRIDAY, October 16, 10 A.M. to 8 P.M.; SATURDAY, October 17, 10 A.M. to 6 P.M. Admission to the public: 2/6. Fellows' tickets admit free of charge.

Lectures

TUESDAY, October 6, at 3 P.M. "Potato Varieties—Old and New" by MRS. N. MCDERMOTT.

TUESDAY, October 20, at 3 P.M. "The Winkworth Arboretum" by DR. WILFRID S. FOX, V.M.H.

TUESDAY, November 3, at 3 P.M. "Perpetual-flowering Carnations" by MR. M. C. ALLWOOD, F.L.S., V.M.H.

There will be no lecture on November 17.

Joint Late-Flowering Chrysanthemum Committee—A Joint Committee of the Royal Horticultural Society and the National Chrysanthemum Society has now been established to deal with Chrysanthemums which normally flower after September. The Committee will meet on October 6, October 20, November 6, November 17, December 1 and January 5. New varieties for certificate should be entered with the Secretary of the Committee by 11.30 on the morning of a Committee Meeting. Copies of the regulations governing the Committee's work may be had on application to the Secretary.

Demonstration at Wisley.—There will be a demonstration at Wisley on Wednesday, November 25, of the Pruning of Fruit Trees. The demonstration will commence at 11 A.M. and will be repeated at the same time on Thursday, November 26.

New Fruits and Vegetables—The President and Council wish to draw the attention of all Fellows and others interested to the fact that the Fruit and Vegetable Committee meets on the first day of each Fortnightly Show throughout the year, and also at the Chelsea Show. Anyone who has produced a new variety of either a fruit or a vegetable which appears to have qualities superior in any respect to those normally in cultivation, is invited to submit it to this Committee with a view to its being considered for an award by the Society. Details of the number of specimens required and entry forms can be obtained on application to the Secretary.

Botanical Magazine—Part 3 of Volume 169 has now been published and contains coloured plates of the following plants. Several of these are of particular horticultural interest: *Arbutus unedo* var. *rubra*, *Campsis* × *Tagliabuana*, × *Chionoscilla Allenii*, *Cyrtanthus falcatus*, *Drimys Winteri* var. *chilensis*, *Erica scabriuscula*, *Euphorbia Robbiae*, *Hosta tardiflora*, *Pyracantha Koidzumii*, *Sarcochilus Fitzgeraldi*, *Selago*

Galpinii. Orders for the four parts of Volume 169 should be sent to the Secretary. The Volume subscription is £4, and the annual subscription, covering two parts only, £2.

Horticultural Club—This Club holds dinners, followed by short talks and discussions, on the evenings of the first days of the Autumn and Winter Shows. The programme for this autumn includes on October 20 a talk, illustrated by coloured slides, on the gardens at Mount Stewart by EDITH, THE MARCHIONESS DOWAGER OF LONDONDERRY, and on December 1 a Symposium on Krilium and Soil Conditioners to be opened by DR. A. J. LLOYD, of the Agricultural Chemicals Group, Development Department of Monsanto Chemicals Ltd., and DR. W. F. BEWLEY, C.B.E., V.M.H., Director of the Research Station at Cheshunt. Further particulars of the Club may be obtained from the Secretary, MR. A. J. HUXLEY, 2–10 Tavistock Street, London, W.C. 2. New members will be welcome.

INVITED TRIALS, 1954–1955

The Royal Horticultural Society will carry out during the season 1954–1955 the following invited trials, for which entries are invited.

Flowers

Canterbury Bell, $\frac{1}{8}$ oz. of seed of each variety.
Chrysanthemum (annual), $\frac{1}{4}$ oz. of seed of each variety.
Freesia, 200 seeds of each variety.
Larkspur, $\frac{1}{2}$ oz. of seed of each variety.
Mignonette, $\frac{1}{4}$ oz. of seed of each variety.
Stocks (summer flowering), $\frac{1}{16}$ oz. of seed of each variety.

Entries to be received not later than December 31, 1953.

Erigeron, three plants of each variety.
Heuchera, three plants of each variety.

Entries to be received not later than March 31, 1954.

Vegetables

Cabbage, 'Christmas Drumhead' types and successional varieties, $\frac{1}{2}$ oz. of seed of each variety.
Parsnip, 1 oz. of seed of each variety.
Radish, 1 oz. of seed of each variety.
Savoy, varieties maturing not earlier than 'Best of All,' $\frac{1}{2}$ oz. of seed of each variety.
Shallots, all types from bulbs, 25 bulbs of each variety.

Entries to be received not later than December 31, 1953.

Conditions for Entry to Trials

1. All entries must be made on the appropriate form obtainable from The Director, The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.

2. The entrant must certify on the form either:

(*a*) that the variety or strain has been raised or developed by him;

or (*b*) that the variety or strain was, or is about to be, introduced by him to British commerce.

The entrant must also supply sufficient particulars of the history of the variety or strain to substantiate his certificate, but such particulars will not be published by the Society without the sender's consent.

3. Entry forms to be received at Wisley by the dates above specified.

4. Seeds and plants should not be sent until the entrant receives notification that his entries have been accepted.

5. For each entry accepted a fee of 10*s*. will be charged.

6. No firm or person may send more than ten entries of any one kind of plant.

Calendar of Invited Trials

1954	1955	1956
	Flowers	
Chrysanthemum (annual)	Begonia	Anemone japonica
Digitalis	Canterbury Bell	Arctotis
Erigeron	Cosmea (sown outdoors)	Coreopsis
Heuchera	Freesia (from seed)	Godetia
Mignonette	Hemerocallis	Lobelia (annual)
Primula malacoides	Iris spuria (its varieties and hybrids)	Primrose
„ sinensis (new varieties of recent introduction)	Larkspur (autumn sown)	Salpiglossis
Stocks (summer flowering)	Schizanthus	Salvia (bedding)
Sweet William	Zinnia (sown outdoors)	Trollius
		Wallflower
	Vegetables	
Cabbage, 'Christmas Drumhead' and successional varieties	Beet, round varieties	Broccoli, sprouting and branching
Lettuce, over-wintering varieties	Cabbage, spring sown varieties maturing not later than 'Winnigstadt'	Celeriac
Parsnip	French Beans, stringless varieties only	Cucumber, Ridge
Radish	Marrows, trailing and bush varieties	French Beans, excluding stringless varieties
Savoy, varieties maturing not earlier than 'Best of All'	Sweet Corn, early and maincrop varieties only for outdoor sowing	Kale, excluding agricultural and rape kales
Shallots		Runner Beans

NOTE.—The years refer to the year in which the trial is judged. The calendar for 1955 and 1956 is provisional and may be altered at a later date.

NOTES FROM WISLEY

WITH the arrival of October, although still there are flowers in the Garden, our thoughts turn away from flowers to the colourings of leaf and bark and to the reasons for this annual autumnal pageant of colour. Though a check to growth appears to intensify autumn colour, why is the Silver Birch always some shade of yellow in the autumn and the Sweet Gum always of reddish hue, and why does the degree of intensity of colour vary so considerably from year to year ?

The colour of a plant organ is the external expression of the internal plant pigments. The green colour of a leaf is due to the presence in the leaf cells of a mixture of four pigments which absorb the complementary red rays of light and reflect the green rays. The yellow colour particularly evident in the young foliage of plants and in the interior leaves of Cabbages and Lettuces is due to the carotenes and xanthophylls which show themselves at the early stages of growth before the sunlight has manufactured sufficient chlorophyll to mask them. These pigments are associated in specialized portions of the protoplasm of the plant cells known as plastids. There are, however, other pigments which are not so associated but are present in the cell sap, particularly in the sap of the epidermal layer of cells. These sap-soluble substances are the yellow anthoxanthones and the red, mauve, purple and blue anthocyanins.

These colours only develop fully in most plants in the autumn when the deeper seated chlorophyll-containing cells disintegrate allowing the nitrogen of which in the main they are composed to be assimilated by the plant before leaf fall. The exact manner in which the anthocyanins are manufactured is not clearly understood, but most workers—particularly American workers—consider that the presence of sugar, tannin, cool nights and bright clear days are necessary factors. Moreover, the actual shade of yellow, red or purple that is obtained largely depends on the degree of acidity within the individual cells, the red colours appearing in acidic, the purples in neutral and the blues in alkaline cells. It has been noted that when flowers die the red pigments often change to blue due to the release of acid and to the cell membranes losing their semi-permeability and thus allowing the overall effect on the flower or leaf to be uniform.

The association of the different pigments naturally also gives rise to different colours. Thus if the yellow carotenes are overlaid by the red anthocyanin a yellow-red or scarlet results; if the anthocyanin is bluish a crimson colour is obtained; while if a reddish anthocyanin overlies chlorophyll the result is a rich brown such as is seen in Coleus leaves.

As no two autumns are exactly alike it is difficult at this date to specify any individual tree or shrub that is likely to be particularly fine this year, but mention will be made of a few of the plants that normally do colour satisfactorily at Wisley. Usually one of the finest sights is

the hedge of *Rhododendron luteum* which lines the broad grass walk up Battleston Hill. Very floriferous and wonderfully fragrant earlier in the year, in the autumn this shrub reveals a wealth of colour ranging from yellows, through oranges to reds. This is not all, for the plant lends itself most easily to the making of an informal hedge that can be kept in bounds by judicious pruning, after flowering, every three years.

The American continent has provided us with many trees and shrubs brilliant in the fall and among the finest is *Quercus coccinea*, with its bright scarlet leaves often persisting until December. There are also selected forms of this species known under such names as 'splendens' and 'Knaphill Scarlet.' All these may be seen on Battleston Hill as well as in Seven Acres, as may the Sweet Gum, *Liquidambar styraciflua* which, originating from Eastern North America, carries a variety of autumn colours in shades of red, crimson and orange. It was originally introduced in the seventeenth century and long has been valued for its fine foliage. It should not be confused, as many do confuse it, with the Maples, which have opposite leaves, whereas those of the Sweet Gum are alternate.

Of the many Maples which are to be seen in the Gardens there are forms of *Acer palmatum* on the Alpine Meadow which are a lovely sheet of purple-red throughout the summer. Others such as *A. saccharum*, the Sugar Maple, only show their bright orange and red colours in the autumn. This species was introduced in 1837 from America where it is found growing along the streets and as isolated trees in the meadows of New England. Unfortunately it is not quite so happy in this country, as it does not grow so rapidly as in its native home. Also from America comes *A. saccharinum* which is considered to be a faster grower but does not have so wide a range of colour as the previous species. One useful for the small garden is the Japanese *A. nikoense* which has much the same autumnal colour as the two former species but not the same ultimate size. Another Japanese introduction is *A. rufinerve* which grows into a tree of medium size and in a favourable autumn colours beautifully. The Chinese *A. griseum*, the Paperbark Maple, is another tree eminently suitable for the small garden providing gorgeously coloured trifoliolate leaves in the autumn as well as a mahogany-coloured bark which curls back to reveal the new bark of orange hue.

Also of Eastern Asia is *A. ginnala*, with wonderful red foliage which unfortunately falls to the ground with the arrival of the first frosts. At no time so spectacular as these and yet at all times a most beautiful tree is the Norway Maple, *A. platanoides*, with in spring clusters of yellow flowers and bright green leaves which turn in the autumn to a clear yellow. It is a tree which is suitable for forming a screen and will tolerate almost any soil. There are many forms of it to be obtained from the trade and we have observed at Wisley 'Drummondii' with leaves margined with white and 'Schwedleri' with leaves of bright purple.

A shrub in the Wild Garden, which on no account should be missed

for it is a glorious spectacle every October, is the Japanese *Disanthus cercidifolia*, whose Cercis-like foliage gradually changes from a dull bluish green to a glowing claret rose suffused with orange. Also in the Wild Garden is a fine specimen of *Oxydendrum aboreum*, a late-flowering American which in July and August produces a mass of small white flowers in a lax panicle. In its native home in the east and south-east United States the foliage in the autumn colours beautifully in shades of red. At Wisley its behaviour is by no means as spectacular as many others. Much the same can be said of another American, *Fothergilla monticola*, for at Wisley it rarely assumes the rich crimson colour which renders it so magnificent in some other gardens, notably at Sheffield Park and at Exbury.

There can be few better garden plants than the various species of *Enkianthus*; they cover themselves with their bell-shaped flowers earlier in the year and colour themselves later in every shade of gold and red. *E. perulatus*, the lowest growing of them all, in the autumn is possibly the most spectacular—a sheet of bronze-red; but *E. cernuus rubens*, so beautiful with its deep red flowers, and the variable *E. campanulatus* both with leaves of red and gold, are also superb plants at this time of year.

Among the Vacciniums which are notable for fine leaf colour we have observed *V. corymbosum*, the Swamp Blueberry, which blossoms most freely in May and June, carries ample blue-black, bloomed, edible fruits and leaves in many shades of crimson during October and November, as well as *V. parvifolium* whose red autumnal foliage is not so regularly seen in gardens as it deserves to be.

There are many species of *Cornus* which are worthy of cultivation either for flower, foliage, fruit or bark. As our concern is with foliage and bark effect we go to the Azalea Garden where the spring-time rosy red bracts of *C. florida* var. *rubra* are followed in the autumn by red and crimson leaves; to Seven Acres where the common Dogwood, *C. sanguinea*, with wood so hard and tough that it can be used for meat skewers, stains its leaves and its stems with purplish red; to the Round Pond where the stems of *C. stolonifera* are a glowing reddish bronze throughout the winter and contrast beautifully with the yellowish green stems of the variety *flaviramea*.

The fine plant of *Parrotia persica*, near the north end of the Vinery, rather outgrowing its allotted space, usually is a brilliant picture of gold and crimson. The dark purple *Rhus Cotinus* var. *atropurpurea* at the bottom of the Award of Garden Merit Collection and the orange-red *R. typhina* in Seven Acres need never outgrow their site for they benefit greatly by hard pruning. They are thus most useful plants for the town garden where hard pruning so often is necessary; moreover, they are remarkably tolerant of the murky atmosphere of the town.

Two Conifers are worthy of note. The fan-shaped leaves of the Maiden-Hair Tree, *Gingko biloba*, gradually change to a clear yellow; the male form of this plant is much more common than the female

which, however, is larger and more handsome of leaf. Although the foliage of *Taxodium distichum* on the island of Seven Acres Lake turns a dark bronzy yellow before falling this small specimen gives but a poor impression of how magnificent the Swamp Cypress may be in the autumn. It is most beautiful in such gardens as the one at Sheffield Park, where, incidentally, there is a remarkable planting of *Nyssa sylvatica*, each specimen a lovely harmony of green, yellow, orange and red. Unfortunately, Nyssa is represented but poorly at Wisley as are the Caryas and the Linderas which elsewhere are ideal subjects for autumnal effect.

Lack of space forbids discussion of the many species of the genera *Cotoneaster*, *Pyrus*, *Prunus*, *Vitis*, *Celastrus* and *Euonymus* in various parts of the Gardens, and of the genus *Viburnum* in the Azalea Garden, which are particularly valuable at this time of year. A walk around the Gardens in search of these plants and a comparison of their autumnal behaviour can be most rewarding. And for those Fellows, who, having a small garden, are in search of small shrubs which will give both leaf and berry colours, the large collection of Barberries in Seven Acres merits careful study.

Well might one say of autumn, as Housman said of spring, "There are so few autumns in a lifetime that we should go about the woodlands every year to see the trees silently putting on their robes of glory . . . before they stand in utter nakedness before the blasts of winter."

THE MASTERS MEMORIAL LECTURE, 1953

THE CONTROL OF FLOWERING BY DAYLENGTH AND TEMPERATURE

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RESEARCH INSTITUTE OF PLANT PHYSIOLOGY, IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY, LONDON, S.W. 7

PART II

(*Lecture given on March* 31, 1953; COL. F. C. STERN, M.C., O.B.E., F.L.S., V.M.H. *in the Chair*)

IN this lecture I shall deal with the control of flowering by variations in temperature.

There is no need to emphasize the effect of temperature upon the growth of plants. Growth is in the first instance a matter of the rate of cell division in the growing points and this process is controlled by the temperature. As the temperature is raised the rate of growth

increases up to an optimum value, and if the temperature is still further increased the rate of cell multiplication again falls.

We must however distinguish between two effects of temperature: first the immediate effects of the ambient temperature, and second, after-effects which may only become apparent after a considerable delay.

DIRECT TEMPERATURE EFFECTS

An example of this kind is the breaking of dormancy of flower buds of Lilac by the warm-bath treatment of Molisch. By steeping the inflorescences in water at 30–35° C. (86–95° F.) for 9–12 hours the dormant flower buds open prematurely. The effect is strictly localized so that open and dormant flowers on the same inflorescence can be secured by local treatment. In this example it is high temperature which breaks dormancy of the flower buds.

A similar effect can be secured with low temperature. Thus in the Pigeon Orchid (*Dendrobium crumenatum*) of the East Indies, the open flowers normally last only one day, and flushes of flowering occur simultaneously over wide areas. This is not a matter of local varieties, as plants brought together in one place behave uniformly. It was found that the flower flushes occur nine days after a rain storm, and the determining factor is the low temperature accompanying the rain. It is interesting that to be effective the temperature change must be sudden; slow cooling of the flower buds has no effect .

INDIRECT EFFECTS OF TEMPERATURE

This is the phenomenon of predetermination, in which the effects of treatment appear only after a period of delay. Such effects are seen in the bulbous plants, in which temperature is the determining factor. The flower initiation occurs after the bulbs have been lifted, and the bulbs which appear to be in a dormant condition actually are then passing through the most active period of development, for at this time the leaves and flowers are formed, which in the following spring appear above ground by expansion of the initials laid down.

At Wageningen the whole range of bulbous plants was studied including Hyacinth, Tulip, Narcissus and the bulbous Irises. As an example the Hyacinth will be cited.

During the period of active growth in spring the carbohydrates formed in the leaves are stored in the fleshy scale leaves and the swollen leaf-bases which constitute the bulb scales, and this material is later drawn upon during the actual initiation of new leaf and flower initials after the leaves and roots have died down. These scale leaves and swollen leaf-bases in the Hyacinth persist for a number of years. The scales are attached to a flattened stem-disc which has a terminal growing point, and during the resting period this gives rise to new leaves and flower rudiments.

If the resting bulb of the var. 'Queen of the Blues' is examined in July just after lifting, the growing point has already produced two

fleshy scale leaves, and five leaf initials. After lifting, one more leaf initial is laid down, giving the maximum number of six leaves and then the flower spike is immediately formed. By the end of September flower formation is almost complete.

In considering the effect of storage temperature on flowering three stages must be discriminated: (1) initiation of flower rudiments which is achieved by cell division; (2) extension growth in which enlargement of the preformed cells occurs, and the inflorescence stalk elongates; and (3) unfolding of the flowers. Each phase is affected by temperature. Cell division is mainly controlled by the temperature prevailing at the time, but after-effects also occur so that a previous exposure to high temperature continues to exert an effect long after the temperature has been lowered.

Both low temperature below 13° C. (55° F.) and high temperature 35° C. (95° F.) maintained throughout storage completely prevent development of inflorescences. During the first three weeks of storage the most favourable temperature is 25·5° C. (78° F.) but this rate of development is not maintained, so that bulbs stored at either 13° C. (55° F.), 17° C. (63° F.) or 20° C. (68° F.) after eight weeks are more advanced. After twelve weeks however those stored at 13° and 17° C. show degeneration or malformation of the flowers. The effect of temperatures too high or too low thus differs radically: with too high temperatures flower initiation does not begin at all until the temperature is lowered, while temperatures which are too low reduce cell division rate so much that not a sufficient number of cells are produced to form the floral organs. Inhibiting effects of low temperature on flower formation result from an exposure of as short as three weeks at 1½° C. (35° F.), and if the bulbs are then removed even to optimal conditions no flowers are formed. To secure the best inflorescences initial high temperature, five weeks at 25° C. (77° F.) must be followed by a lower temperature of 18° C. (64° F.) until planting.

For forcing bulbs the requirements of temperature during storage are somewhat different, as what is needed here is the maximum rate of development of the inflorescence. High temperature favours cell division rate, and if maintained for only a short period the deleterious effects of longer exposures are avoided. The storage treatment recommended begins with a few days at 34° C. (93° F.), which has an after-effect in promoting more rapid extension of leaves and flowers, although at the time of application development is arrested. Following this the main part of the storage period (six weeks) is spent at 25·5° C. (78° F.) which is most favourable for rapid development of the inflorescence. It is essential that this temperature should not be prolonged beyond the stage at which the outer petals are just developing, and the bulbs must then be removed to a temperature of 17° C. (63° F.) for three weeks until planted in soil; after this the temperature should again be lowered to 13° C. (55° F.) until the "nose" of the bulb has emerged 1½ inch above the soil. The bulb is then ready for forcing at 25° C.

(77° F.) while the leaves and inflorescence grow rapidly. At the time of flower emergence a further lowering of temperature to 15° C. (59° F.) is desirable.

The brief outline of the effects of temperature in the Hyacinth stresses the predominant effect on flower initiation and further development. As I mentioned in the first lecture, bulb size is a determining factor, a minimal size being necessary, and this effect may be due either to the need for carbohydrates stored in the bulb scales or perhaps to a precursor of a flowering hormone. Flower initiation in the Hyacinth requires relatively high temperatures: low temperatures round about 2° C. (36° F.) inhibits flower formation completely. The optimal temperature varies with different varieties and species. There are, however, plants which demand low temperature for initiation of flowers: these include biennial plants such as Beets, Henbane (Hyoscyamus), and above all the cereals and grasses. This phenomenon of flower induction by low temperatures has been named "vernalization."

Let us consider first the case of the Brassicas, in particular the Brussels Sprout studied by MISS STOKES and VERKERK. This plant is quite indifferent to daylength, and low temperature alone will induce flowering. The treatment of the germinating seed at low temperature is without after-effect, nor can flower induction be achieved while the plant is in a "juvenile" condition. This "juvenile" condition persists for more than eight weeks from germination, and change to the "adult" stage is accompanied by a very rapid change in the appearance of the growing point, which then enlarges owing to the increase in number of leaf initials. Owing to this enlargement of the growing point the stem becomes more massive. Puberty occurs when the number of leaves has reached about thirty. The plant is now in a condition to respond to vernalization. For full induction of flowers approximately nine weeks at 36–37° F. are required.

The Brussels Sprout thus exemplifies very clearly the stage of "ripeness to flower" or puberty as postulated by KLEBS, and as we have seen this is associated with a minimum leaf number. Other plants which behave in a similar way are the Foxglove, Stocks, Sweet William, and other Brassicas, such as Cabbage, and Sweet Turnip.

VERNALIZATION OF CEREALS

The phenomenon of vernalization, or cold requirement for flower initiation, was first studied in the cereal plants by GASSNER in 1918. In these plants the necessary exposure to low temperature may be given during the germination of the grain. It is generally known that the temperate cereal plants, Wheat, Oats, Barley, and Rye all include two classes, namely the spring and winter varieties. These classes show marked differences in their reaction to sowing date. The winter varieties are in practice sown in autumn and then germinate and over-winter in the field. They are thus exposed to two environmental effects, namely low temperature and short days. If the sowing date of

winter cereals is delayed too long in the spring the plants fail to produce a crop. If, however, the grain is germinated at low temperature before planting out the effect of delayed sowing date largely disappears. The later the plants are sown out the lower the temperature of germination must be to ensure the production of normal ears. The relation between temperature of germination, sowing date, and time to "shooting" and emergence of the ear is seen for spring and winter varieties of Petkus Rye in the experiments of GASSNER.

The work of GASSNER was not followed up until 1928 when LYSENKO in U.S.S.R. developed the technique of vernalization, and in 1932 when MISS PURVIS began her work on Petkus winter Rye. LYSENKO'S achievement was the discovery that vernalization could be carried out on germinating grain kept short of water, so that very little growth was made during the low temperature treatment, and the grain could afterwards be sown with a drill without inflicting any permanent injury on the young plants. In this way vernalization became a practical technique in agriculture. The success of the treatment on Petkus winter Rye is seen in the photograph (Fig. 108—top). The unvernalized controls in July are still vegetative, and the treated grain is in full ear. In the experiments carried out by PURVIS the first aim was to determine whether there was any truth in the suggestion made by MAXIMOV that the acceleration of flowering due to vernalization was bound up with the reduction in vegetative vigour: in a word, whether it was a question of antagonism between vegetative and reproductive growth.

By carrying out the experiment at high and low nitrogen levels (Fig. 109) it was shown that the effect of vernalization on ear production was quite independent of the amount of vegetative growth made: at both levels of nitrogen vernalization reduced tillering, and accelerated ear production. In the same experiment however the daylength was reduced to 10 hours' light per day (Fig. 108—centre), and in consequence the effect of vernalization had apparently vanished. It was thus demonstrated that daylength was concerned in the process, and that interaction of daylength and temperature occurred. A similar result was obtained with the Corn Cockle (*Agrostemma Githago*). MELCHERS and LANG in their work used the Henbane (*Hyoscyamus niger*). This plant has two varieties an annual and a biennial. The annual variety is a typical long-day plant and requires no low temperature for flower induction. The biennial variety produces a rosette of leaves and a storage organ in the first year, and in the second year proceeds to flowering. In its first year the biennial form is indifferent to daylength, but it can be vernalized and then resembles the annual in its flowering requirements. In short days the vernalized and unvernalized Hyoscyamus both fail to flower. Again an interaction occurs between vernalization and photoperiodic reaction.

To return to the behaviour of Petkus winter Rye. Grown in short days both vernalized and unvernalized plants produce no visible ears, and the same is true of spring Rye, which requires no vernalization.

This appearance of the plants is however deceptive, for if one dissects the plants one finds that in fact an ear has been produced, but has failed to emerge. This is due to the fact that for shooting, i.e. stem elongation and emergence of the ear, long days are required.

The analysis of the vernalization process requires examination of the growing point by dissection. If one examines the growing point of the plant one finds that alternate ridges appear, which are the initials of leaves. The first sign of flowering is the production of "double ridges" first described by PURVIS in 1934. These consist of initials of spikelets arising in the axils of leaf initials. The position on the plant at which these "double ridges" first appear depends upon the variety and treatment. In spring Rye grown in normal long days after 6 or 7 leaf primordia have been produced "double ridges" appear; this marks the onset of "ripeness to flower" or puberty. If spring Rye is grown in short days of 10 hours "double ridges" do not appear until more than 20 leaves have been laid down. Unvernalized winter Rye in normal summer days behaves in the same way, producing first more than 20 leaves. In completely vernalized winter Rye, however, in long days the leaf number falls to below 7, and thus fully vernalized winter Rye behaves just like spring Rye. Since the leaves emerge at the rate of about one per week, this means that before ear emergence can begin in spring Rye the plants must be at least seven weeks old if grown in normal long days, whereas unvernalized winter Rye grown in normal daylength cannot produce emerged ears in less than six months. If unvernalized winter Rye is sown in late spring, ear production therefore does not occur until autumn, by which time the days have already become so short that elongation of the stem and emergence of the ear fails, and therefore the plant appears to be still in a vegetative condition. By giving long days ear emergence can be secured.

The need of winter cereals for both low temperature and long days to ensure ear formation and emergence was emphasized by LYSENKO in his theory of Phasic Development. According to this theory the plant passes first through a Thermophase demanding low temperature, and then passes into a Photophase demanding long days. This, as will appear later, is true; but LYSENKO erred in suggesting that the thermophase must be completed before the photophase can begin. That this is not true can be shown in two ways. First, by giving varying times of low temperature a graded effect on ear formation results, and therefore varying degrees of vernalization can be secured (Fig. 108—bottom) and evidently the plant can pass into the photophase even though the thermophase is not completed. In such duration experiments the number of leaves produced on the main axis progressively falls from a maximum above 20 to a minimum of 6 or 7; and this reduction in leaf number is accompanied by a progressive hastening of ear production; thus unvernalized winter Rye after planting out required more than 160 days, while after 7 weeks of vernalization the number of days required has fallen to 49.

Even more decisive evidence against LYSENKO's theory is the fact that in winter Rye flowering and ear production can be achieved without giving low temperature, by submitting the plants to a preliminary period of short days (Fig. 110—top). In this case the thermophase is omitted altogether. This phenomenon is a case of photoinduction. The effect of short days reaches a maximum after a preliminary treatment of 6 to 8 weeks. If short days are continued for longer than this period ear production is again delayed.

Winter Rye thus behaves like a short-day plant in the early stages of development, and later behaves like a long-day plant. The effect of short days is to hasten initiation of flowers, but for further rapid development of the spikelets long days are required, and also for the extension growth of the stem and thus for ear emergence. That unvernalized winter Rye in the early stages does in fact behave like a short-day plant is shown by interrupting the dark period of the short days by a brief exposure to light, under which conditions photoinduction fails. The effect of long days is best seen by growing unvernalized winter Rye in continuous light, when ear production is achieved.

THE PERCEPTION OF LOW TEMPERATURE

The grain of the cereals is a complex structure containing the embryo as well as the endosperm which acts as a store of nutriment on which the embryo draws during germination. To separate the effects of low temperature on these various parts of the grain, and thus to analyse the process of vernalization the method DR. PURVIS used was to take out the embryo and grow it on a nutritive medium. In this way many problems could be successfully investigated.

It was found that the isolated embryo could be vernalized and the various effects on whole grain already described could be reproduced (Fig. 110—centre and bottom). It thus appeared that the effect of low temperature was directly on the embryo; indeed by cutting off the extreme apex of the growing point and culturing this on a nutrient medium, DR. PURVIS showed that the isolated apex would regenerate a root system and after vernalization grow into a complete plant which produced an ear. Thus vernalization occurred in the growing point itself. In this way vernalization differs radically from photoperiodism for as we have seen daylength effects are perceived in the leaves of the plant.

Using isolated embryos it was shown that a sugar supply is required for vernalization, and also presence of oxygen (Fig. 111—left). As only very small quantities of sugar, preferably cane sugar, are required the starch normally present in the embryo is sufficient to achieve vernalization if sufficient time at low temperature is given.

In the experiments so far described the low temperature was given during the germination of the grain. It appeared important to know whether low temperature given during the time of formation of the embryo would induce the vernalized condition. This was achieved by exposing the ear immediately after fertilization to low temperature by

enclosing it in a thermos flask surrounded by ice. These experiments were successful, and ears treated in this way produced ripe grain which when planted out produced fertile plants without further vernalization (Fig. 111—right, top and bottom). Vernalized plants grown under conditions of low temperature during harvest ripening would thus produce grain resembling a spring variety and it would appear as if vernalization could be inherited. LYSENKO has in fact claimed to have shown this, and one can see how such a mistaken notion could arise.

DEVERNALIZATION

As we have seen, the low temperature treatment is given at the time of germination, and the seedlings afterwards grown at higher temperatures retain the vernalized condition. If, however, vernalization treatment is given for a comparatively short time and immediately afterwards the vernalized seedlings are removed to high temperature such as 35° C. (95° F.) the vernalized condition is in part destroyed. This has been called devernalization. The effect of heat treatment at 35° C., given for varying periods after the end of six weeks' vernalization, is shown in the following table:

Table showing the effect of heat treatment (35° C.) of varying duration on grain of Petkus winter Rye previously vernalized for six weeks at 1° C., and on unvernalized Petkus spring Rye

Duration of heat treatment	Spring Rye Unvernalized	Winter Rye	
		Vernalized six weeks then heated	Revernalized for six weeks after heat treatment
0 (Control)	123 ± 0·1	100 ± 3	112 ± 1·2
1 day	120 ± 0·7	75 ± 7	117 ± 0·5
2 ,,	121 ± 0·7	80 ± 6	113 ± 0·9
3 ,,	124 ± 0·4	72 ± 9	118 ± 0·7
4 ,,	123 ± 0·5	72 ± 6	117 ± 0·6
5 ,,	120 ± 0·6	63 ± 7	116 ± 0·7

The values entered in the table show the degree of vernalization attained; the higher the "score" the greater the degree of vernalization. The values in column 2 show that heat treatment has no effect on earing behaviour of spring Rye. On winter Rye prolonging the heat treatment leads to partial loss of vernalization, as shown in column 3. The partially devernalized grain can however again be vernalized as is shown in column 4. The effect of the heat treatment is therefore not due to injury of the grain, since spring Rye similarly heated shows no adverse

effects, and further low temperature treatment again fully restores the vernalized condition.

When heat treatment is given after varying times of vernalization it is found that as the vernalization process is prolonged the vernalized condition becomes progressively more resistant to heat treatment, so that after twelve weeks' cold treatment the vernalized condition can no longer be reversed. Evidently some heat stable product is formed and accumulates. After devernalization by heat has been carried out the grain can be vernalized once more; which indicates that the vernalization process can be made to move forwards or backwards at will.

A similar devernalization effect has been found in vernalized biennial *Hyoscyamus niger*. In the Chrysanthemum, which can also be induced to flower earlier by vernalization, the condition cannot be readily reversed by heat treatment, on the other hand in this plant the vernalized condition can be destroyed by long exposure to low-intensity light.

THE MECHANISM OF VERNALIZATION

We have seen that the effect of vernalization is confined to the embryo, and it may not be unreasonable to suppose that the effect of low temperature is to promote the formation of some definite substance, or hormone precursor, which accumulates in the growing point. The embryo of spring Rye then differs from that of winter Rye in that this substance is always present, whereas in winter Rye it is formed under the influence of cold. This is due to some genetic factor in the spring Rye which is absent in the winter variety. That this is so is shown by the fact that the hybrid of spring and winter Rye behaves like spring Rye, and in the second generation segregation occurs in the ratio of three spring to one winter type. A single recessive Mendelian factor is thus present in winter Rye, which inhibits the formation of the effective substance except at low temperature. After the period of vernalization the substance formed is present in the shoot apex. It can easily be shown that once formed there this substance continues to form and is distributed through the plant. Thus if the main shoot is removed soon after germination, and the first and second flush of tillers are likewise removed, the third flush which is allowed to grow is found to produce ears. As the buds from which these branches arise were not present at the end of vernalization the effective substance must have continued to be produced and becomes distributed in all the buds as they arise.

The devernalizing effect of high temperatures occurs at any temperature above 12° C. (54° F.). The fact that devernalization disappears as vernalization proceeds, indicates that there are two stages in the formation of the end product, an intermediate stage which is unstable at high temperature followed by a stage which is stable to heat. For this reason when vernalization is complete and the seedlings are planted out high temperature no longer destroys the vernalized condition.

The end product of the vernalizing process is however not yet the flowering hormone, for as we have seen photoperiodic reactions then

occur which are the same in spring and winter Rye. But in winter Rye the effect of low temperature can in part be replaced by short-day induction. This is true of winter cereals and some other grasses, but is not so in *Hyoscyamus niger*.

I have now outlined the main facts of both vernalization and photoperiodism and have indicated the close relation that exists between these phenomena. To show how photoperiodic reactions are modified by temperature I may cite the case of Phlox and Stock. Phlox is a plant which flowers best at warm temperature, while Stock flowers best at cool temperature. Even 'Maryland Mammoth,' the typical short-day plant, will form flower buds in long days at cool temperature, while at warm temperature it behaves normally and remains vegetative in long days; thus at low temperature short-day plants behave more like long-day plants. The long-day plant, *Hyoscyamus niger*, has a critical daylength of 8·6 hours at 15·5° C. (60° F.) while at 28·5° C. (83° F.) the critical daylength is increased to 11½ hours. Thus at low temperatures the long-day plant behaves more like a short-day plant.

EVIDENCE FOR EXISTENCE OF A FLOWERING HORMONE

In my first lecture I showed how the flowering impulse can be transmitted about the plant, and suggested that this was evidence for the existence of a special flowering hormone.

The clearest evidence of this point comes from grafting experiments.

The questions which must be answered are the following:

(1) Is there evidence for a flowering hormone ?

(2) Is the flowering hormone of short-day plants the same as that of long-day plants ?

(3) Is the same hormone produced as the last product of vernalization ?

Let us first take the case of *Hyoscyamus niger*. If the annual form is grafted on itself, both scion and stock flower in long days, while with the biennial form grafted on itself neither stock nor scion flower in the first year. When annual Hyoscyamus is grafted on biennial Hyoscyamus the stock, which normally fails to flower in the first year, now flowers. Exactly the same result is obtained by grafting the vernalized biennial on the unvernalized biennial. The flowering induced by vernalization is transmitted to the stock. Evidently the end product of vernalization acts in the same way as the flower-inducing properties of the annual plant.

The flower-inducing stimulus is not specific. Thus *Nicotiana tabaccum* (var. 'Corvalla'), a long-day plant, grafted as scion on the unvernalized biennial Hyoscyamus, leads to flowering of the stock. Again Petunia grafted on Hyoscyamus can induce flowering.

The flower-inducing stimulus of a short-day plant can be transmitted to a long-day plant. Thus if *Nicotiana* var. 'Maryland Mammoth,' a short-day plant, is grafted on to annual *Hyoscyamus niger*, a long-day plant, and both partners are kept in short days the Tobacco, as expected, flowers, and so does the long-day Henbane. If the Hyoscyamus is kept in short days and the 'Maryland Mammoth' in long days, neither partner flowers, as would be expected. Even a single leaf grafted on to a scion can induce flowering. Thus one leaf of Hyoscyamus annual (L.D. plant) grafted on to 'Maryland Mammoth' (S.D. plant) and the partners kept in long days, will induce flowering in the short-day stock. As expected, one leaf of the unvernalized biennial Hyoscyamus grafted on 'Maryland Mammoth' in long days fails to induce flowers. There is thus evidence that the same flowering-inducing substance is formed in long-day, short-day, and vernalized plants.

The last question which must be raised is the nature of the stimulating substance. Efforts to extract the stimulating substance from long- and short-day plants have in the main failed. ROBERTS, however, has extracted in mineral oil from Xanthium in the flower-induced state a substance which has some effect on non-induced Xanthium plants.

Quite recently, also, DR. PURVIS has been able to extract from vernalized embryos of winter Rye in chloroform, a substance which, when incorporated into a nutrient medium on which unvernalized embryos were grown, considerably accelerated the flower induction of the unvernalized plants. An effect as great as nearly three weeks of low temperature treatment was obtained. This is at least promising. In two cases specific chemical substances have been shown to induce flowering. The first case is that of the Pineapple, in which sprays of naphthalene acetic acid have proved so successful that this treatment is now used on a vast scale in Hawaii. The other case is that of the Tomato, in which by spraying with tri-iodobenzoic acid all the vegetative buds on the plant have been converted to inflorescences, and even in the very young seedlings inflorescence formation has been induced.

Both these substances belong to the group of growth hormones known as auxins, and it is held by many physiologists that flower induction is one of the many activities controlled by these substances, and that the effects of daylength on flowering are due to the effect of light and darkness on the concentration of the auxins in plants. This is too large a topic to discuss at the end of a lecture. Undoubtedly if the flowering hormone can be extracted and identified a revolutionary change in horticultural practice will result, but this desirable goal has not yet been reached.

REFERENCES

GASSNER, G. (1918): "Beiträge zur physiologischer characteristik Sommer- und Winter- annualer Gewächse insbesondere der Getreidepflanzen." *Zeit f. Bot.* **10,** 417–30.

GREGORY, F. G. & PURVIS, O. N. (1938): "The vernalization of excised mature embryos and of developing ears." *Ann. Bot. N.S.* **2,** 237–52.

GREGORY, F. G. & PURVIS, O. N. (1938): "The use of anaerobic conditions in the analysis of the vernalizing effect of low temperature during germination." *Ibid.* **2,** 753–64.
MCKINNEY, H. H. & SANDO, W. J. (1935): "Earliness of sexual reproduction in wheat as influenced by temperature and light in relation to certain phases." *J. Agr. Res.* **51,** 621–41.
MURNEEK, R. E. & WHYTE, R. O. (1948): "Vernalization and photoperiodism (a symposium)." *Ed. Chron. Bot.* (Lotsya) Waltham.
VAN OVERBEEK, J. (1951): " Use of growth substances in tropical agriculture. Plant Growth Substances." Univ. Wisconsin Press.
PURVIS, O. N. (1934): "An analysis of the influence of temperature during germination in the subsequent development of certain Winter cereals, and its relation to the effect of length of day." *Ann. Bot.* **48,** 419–45.
PURVIS, O. N. (1937): " Recent Dutch research on the growth and flowering of bulbs. I. The temperature requirements of Hyacinths." *Sci. Hort.* **5,** 127–40.
PURVIS, O. N. (1938): II. " The temperature requirements of Tulips and Daffodils." *Ibid.* **6,** 160–77.
PURVIS, O. N. (1944): "The role of carbohydrate and nitrogen supply in the vernalization of excised embryos of Petkus rye." *Ann. Bot. N.S.* **8,** 285–314.
ROBERTS, R. H. (1951): " The induction of flowering with a plant extract. Plant Growth Substances." Univ. Wisconsin Press.
SCHWABE, W. W. (1950): "Factors controlling flowering in the chrysanthemum." I. "The effects of photoperiod and temporary chilling." *J. Exp. Bot.* 1, 329–43.
SCHWABE, W. W. (1951): II. " Day length effects on the further development of inflorescence buds and their experimental reversal and modification." *Ibid.* **2,** 223–37.
STOKES, P. & VERKERK, K. (1951): "Flower formation in Brussels Sprouts." *Med. v. d. Landbouwhogeschool Wageningen.* **50,** 141–60.
WHYTE, R. O. (1939): "Phasic development of plants." *Biol. Rev.* **14,** 51–87.

HARDY FLOWERS FOR CUTTING

Frances Perry

(*Lecture given on July* 28, 1953; MR. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H. *in the Chair*)

THOSE who love flowers are rarely satisfied to keep their fragrance and beauty solely for garden adornment. As Ruskin says, "They are the cottager's treasure, and in the crowded town, mark, as with a little broken fragment of rainbow, the windows of the workers in whose heart rests the covenant of peace."

For many of us a house without flowers is like a world without children or a wood without birds. The pleasure they give bears no relation to their value or substance. Often a posy of humble Primroses will lift the heart and give more joy than a vase of Lilies or exotic Orchids. The reasons for this are often elusive and indefinable, yet may be linked with the appropriateness of flowers and container to the room and the occasion.

Experimenting with flowers and testing a wide range of material, flower lovers soon found that some plants lent themselves more readily than others to room decoration. Those with praiseworthy attributes were marked down and fostered, good points being perpetuated and faults minimized by skilful breeding. That is why so many of our

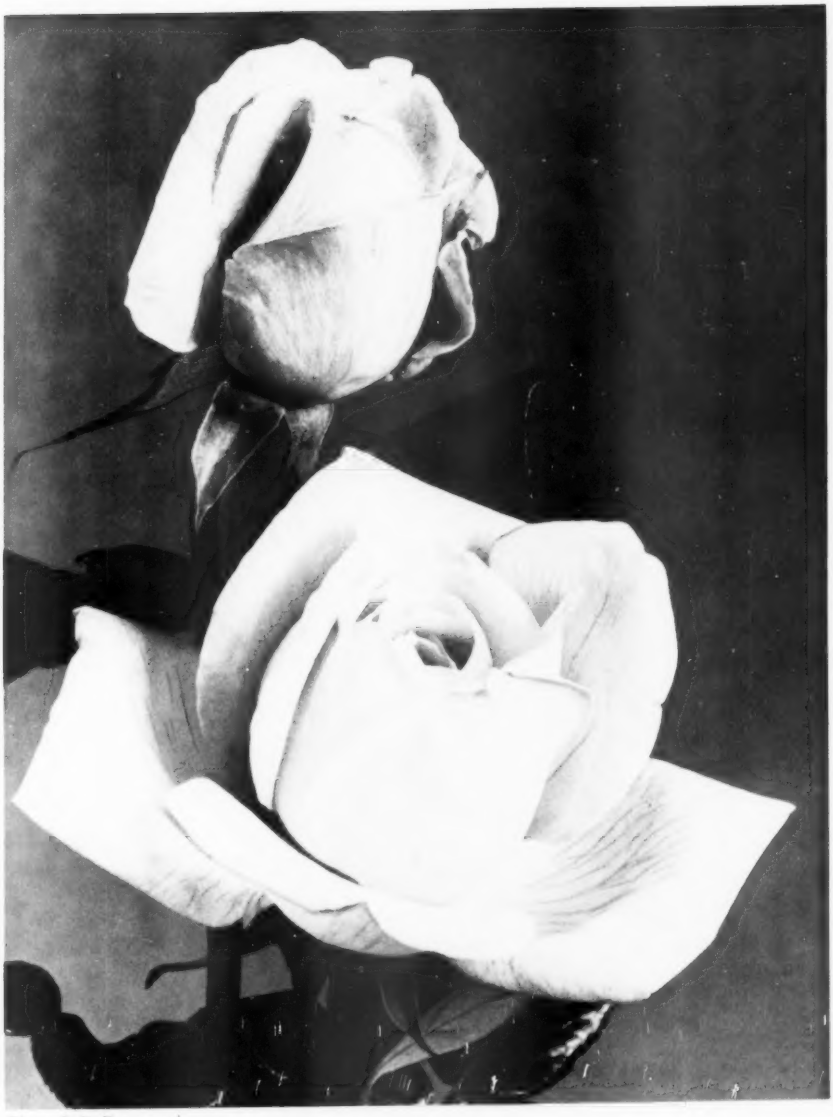
garden flowers last longer than wild ones. They have been bred and selected to that very end. Similarly larger and more blossoms, stouter stems and a wider colour range commend themselves to the plant breeder, who thus extends the scope of a single genus far beyond its original status. When we come to consider flowers for cutting therefore, we benefit considerably from the labours and enthusiasms of this select band of plantsmen. But it does not follow that all their achievements suit the decorator. Often the objective has been a good flower garden, and it is no criterion that what is good in the border will be equally fine in a vase.

Let us consider the points a flower arranger should look for:

1. *Good Habit*—This means the ability to display the blooms to advantage. With the round, top-heavy type of flower, like Scabious, Chrysanthemum, Dahlia and Carnation this indicates stout, straight stems with a strong neck to the bloom so that it does not tilt forward in the vase. With plants of spray-like habit, such as the Rubellum Chrysanthemums, stiff upright growth is not essential, for the modern flower arranger frequently seeks the bowed specimen in order to fix the outline of his design. With spikes—like Delphiniums and Lupins—one does not want too many bald patches on the stems, but rather a compact even distribution of flowers for a moderate, but not exorbitant length of stem. Massive spires and dense massing of blossoms are more useful in the border than the vase. When several large flowers arise from a single stem, as in *Iris barbata* or Hemerocallis, the blooms should be well poised and held away from the stem, so that each one shows to advantage. A drooping, nodding habit is characteristic with Snowdrops and Fritillaria, but should not be encouraged with the 'Daisy' types. Otherwise the back of the flower shows instead of its more attractive centre.

2. *Longevity*—When we have expended time over a flower arrangement we naturally want it to last as long as possible, so that it is only to be expected that those flowers which last well when cut are much in demand. When the blooms are gathered from the garden the matter is of even greater importance, as careless and extravagant culling soon leaves gaps in the borders. Bought flowers, too, are usually selected for their freshness and long-lasting qualities.

3. *Colour*—This point is to a large extent dictated by personal preference, or the colour schemes of the house. Obviously those who like yellow will grow Doronicums, Anthemis, Chrysanthemums, etc., in order to maintain a continuity in that shade. But for general purposes a variety of flower shapes, forms and colours will give more interest, and extend the scope of flower arrangement. One colour however seems to have universal appeal and that is blue. Scabious, Michaelmas Daisies, Delphiniums and Campanulas are always in demand and seem to fit into most decorative schemes. White is a different proposition. I know several gardeners who will never have a white bloom in their



Photo, J. E. Downward

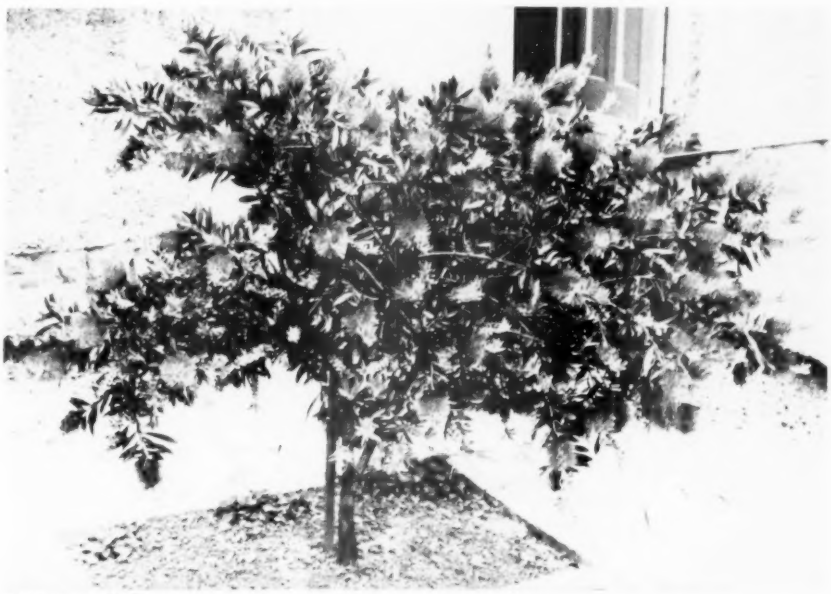
NEW ROSES

FIG. 104—Rose 'Grandmère Jenny' (See p. 386)

Photo, J. E. Downward

FIG. 105—Rose 'Tzigane' (See p. 385)

FIG. 106—International jury judging Roses at Geneva, June 1953



Photo, R. A. Malby

FIG. 107—*Callistemon citrinus* var. *splendens* on July 1, 1953, in the front garden of MR. E. C. COOK at 12 Percival Road, Fulham, Middlesex (See p. 388)

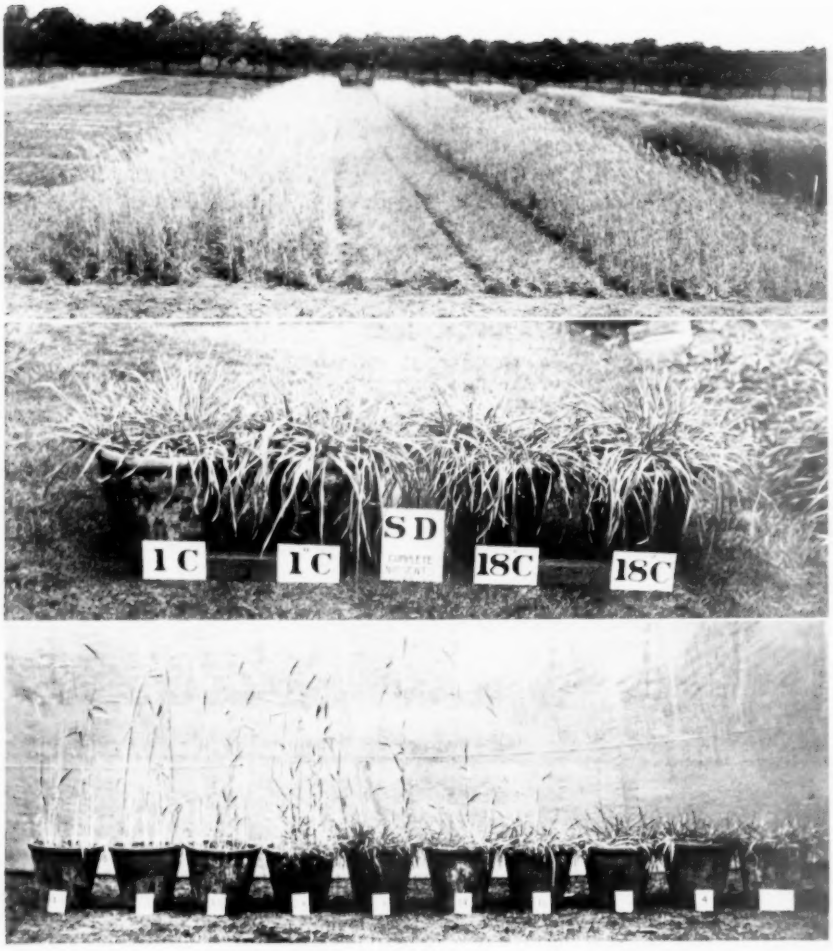


FIG. 108—(top) Field experiment with Petkus winter Rye. The two central strips were unvernalized, the outer strips vernalized for 6½ weeks at 34° F. Sown on April 27, photograph taken on July 8. The unvernalized plants are still vegetative, the vernalized in full ear. (See p. 366)

(centre) Petkus winter Rye grown with high nitrogen supply after germination at 1° C. (34° F.) and 18° C. (64° F.). The plants were grown in *artificially shortened days* (*daylength* 10 *hours*). (See p. 366)

(bottom) Petkus winter Rye exposed during germination to varying number of days at 34° F. Increased duration of exposure to low temperature leads to hastening of ear production and reduction of vegetative growth. (See p. 367)

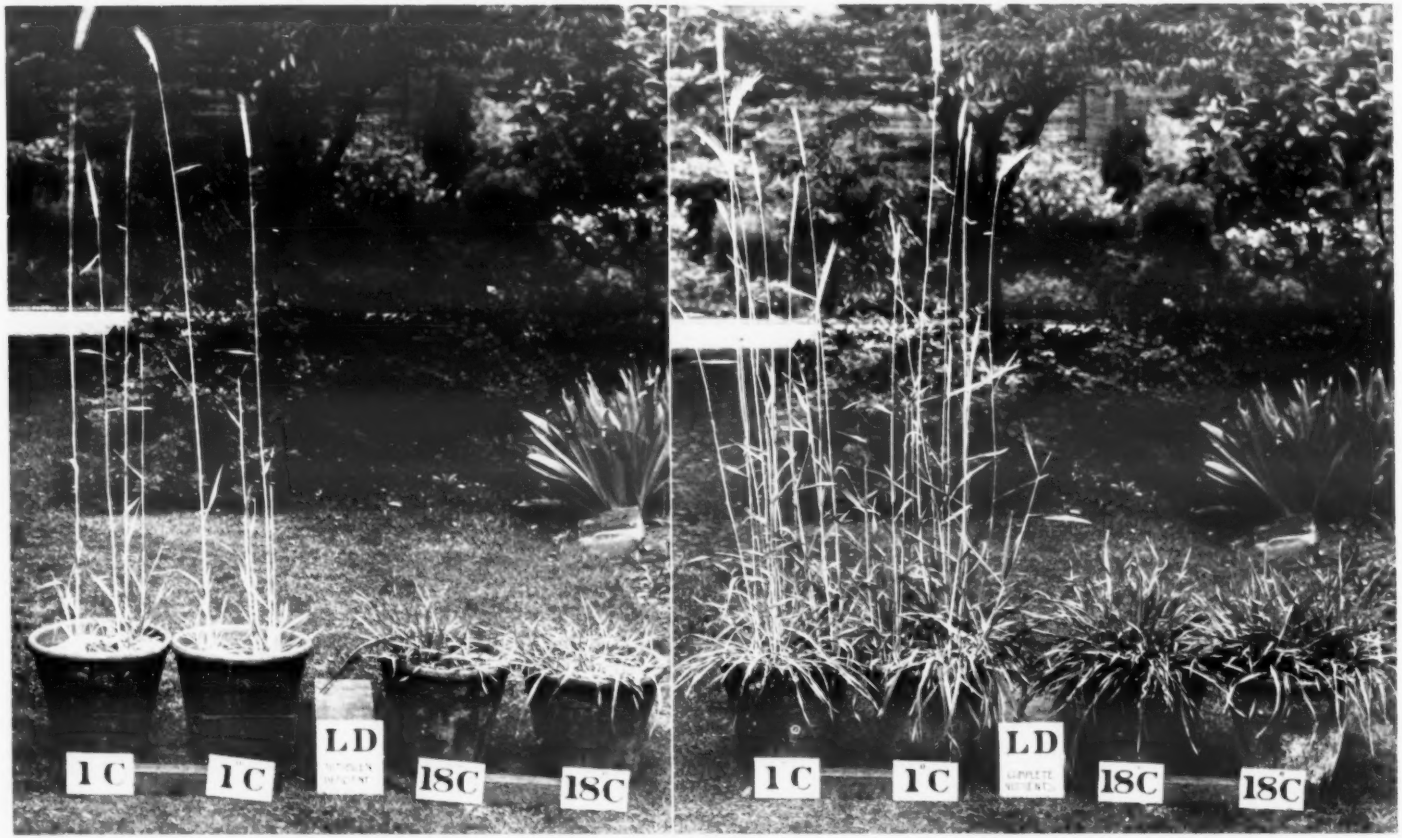


FIG. 109—(left) Petkus winter Rye grown with *low* nitrogen supply, after germination at 1° C. (34° F.). The plants were grown in the normal days of summer (daylength 16 hours)

(right) Petkus winter Rye grown with *high* nitrogen supply, after germination at 1° C. (34° F.) and 18° C. (64° F.). The plants were grown in the normal days of summer (daylength 16 hours) (See p. 366)

FIG. 110—(top) Petkus winter Rye (unvernalized) grown for varying number of weeks in short days (10-hour) and then transferred to normal summer days. The plants at extreme right were grown throughout in long days ; those on extreme left throughout in short days (10-hour) (See p. 368)
(centre) Petkus winter Rye showing effect of varying duration of vernalization on whole grain and (bottom) isolated embryos (See p. 368)

FIG. 111—(left) Petkus winter Rye showing effect of oxygen during vernalization. Plants on left grown from seed vernalized for 12 weeks in nitrogen, on right vernalized in air for same time (See p. 368)
(top right) Petkus winter Rye grown from grain vernalized during ripening and sown without further cold treatment
(bottom right) Petkus winter Rye grown from grain exposed to normal temperature during ripening (See p. 369)

Photo, J. E. Downward

FIG. 112—Lilium 'Enchantment' **A.M.** July 7, 1953. Raised by MR. JAN DE GRAAFF of the Oregon Bulb Farms, Portland, Oregon. The flowers are Nasturtium Red. Exhibited by The Commissioners of Crown Lands, Windsor Great Park, Berks. (See p. 392)

Photo, N. K. Gould

FIG. 113—Lilium 'Marlyn Ross' **A.M.** May 19, 1953. A hybrid raised by MR. D. J. ROSS of Hawera, New Zealand, from a cross between *L. dauricum* and *L. sulphureum* (See p. 392)

home or garden, whereas there are others who must always have a "white" decoration somewhere in the house.

4. *Ease of Cultivation*—"Difficult" plants may represent a challenge to the gardener, but do not commend themselves to those who seek constant and abundant supplies of flowers. Here the grower looks for trouble-free subjects, free flowering yet reliable and amenable to normal cultivation. Staking is a necessary evil with a number of otherwise good cut flowers. Coreopsis, Erigerons and some Anthemis show a tendency to sprawl, so that the flowers become muddy and the stems arch themselves into fantastic shapes. With such plants it is essential to stake, and stake early. Twiggy peasticks make admirable supports and should be thrust amongst the new growths in spring, whilst these are only a few inches high. As the stems develop they grow through these sticks and completely mask them, ***but***, in so doing, receive most effective support.

Again, ease of cultivation will to some extent be dictated by soil, situation and climate. Gardeners are often contrary and get more joy out of the errant flower which appears on some "difficult" plant, than they do from bouquets of blossom on a more prodigal subject. But this attitude should not extend to those who grow flowers for cutting and it would be unwise to try noted lime haters—like *Iris Kaempferi*—on chalky soils, or struggle with shy bloomers when more profitable specimens could take their place.

5. *Long Flowering*—By this I mean one of two things. The life of the individual flower is long—as in Chrysanthemum and Doronicum, or bloom persists over an extended season, as with Erigeron, Chrysanthemum 'Esther Reed' and *Scabiosa caucasica*. The latter plants are "rent-payers" in the garden and worth more to the average housewife than a host of ephemeral beauties.

6. *Fragrance*—This point is too often neglected, and yet should be of inestimable value in the art of flower arrangement. To enjoy cut flowers with the eye is one thing, but when they possess fragrance as well the pleasure is doubled. Of course there are people allergic to certain flower scents, particularly Lilies and Philadelphus, and these will naturally wish to avoid their *bêtes noires*. However, there are others which they will probably enjoy, elusive and honeyed like Verbascum and Oenothera; penetrating and powerful as with Acidanthera or Lily-of-the-Valley; or noticeable only when touched as with Monarda and Tansy.

7. *Foliage*—In considering flowers for cutting I do not feel that we should lose sight of the beauty of leaves. Many hardy plants possess handsome foliage which give substance, grace and sometimes colour to flower arrangements. I am very fond of a vase made up entirely of leaves—of various shapes, textures and shades. Many of these are hardy perennials such as Paeonies, variegated Irises, Fennel, Macleaya, Pulmonaria and *Stachys lanata*. But there are many others, and they have a value quite apart from garden adornment.

CULTIVATION

In order to preserve harmony in the garden it is politic when the call on cut flowers is heavy, to devote one or two borders to their cultivation alone. These need only be very short, with the plants set out in straight lines for ease in cultivation and picking. Such methods allow the grower every chance to produce good blooms; feeding, staking, watering and spraying being carried out in a series of quick and easy operations. Beds devoted to specific perennials may then be put down for two or three years, and then lifted, divided and replanted in a fresh spot.

PREPARING THE BLOOMS

Perhaps the most important thing to remember when cutting flowers is that (*a*) you have performed a surgical operation on the plant, and (*b*) cut off its source of food supply. When fed by the roots, soil water enters the cells by means of osmosis and from thence is forced up to the topmost parts of the plant or tree. This root pressure as it is called exerts considerable force, as one can notice in spring by cutting a vine. So prolific is the flow of sap from below that it drips from the wound, or "bleeds" as we term it. Once the flower stem is cut this pressure ceases and the method of obtaining water changes. Now the plant must *draw* up its nourishment—a very different procedure from receiving a pumped supply. Any mineral salts in solution the plant retains, but much of the water is passed out from pores (stoma) on the leaves, in the form of water vapour. SIR EDWARD SALISBURY has stated that an Oak tree in full leaf takes in a ton of water a day. It certainly cannot accommodate such a quantity and so *has* to pass off the surplus in this way.

When a plant is cut the leaves continue to pass off water vapour, or transpire as we call it, but somewhat handicapped due to the slower rate of intake. That is why many cut flowers flag in vases. The stems just cannot manage everything—to take in water, look after the flowers and transpire all at the same time. Removal of some of the leaves therefore is only common-sense procedure. Placing wilted blooms in warm water is also sound practice, for this will rise more quickly than cold and so starts the flow into the stem.

Flowers for cutting should always be gathered in the cool part of the day—*never* when the sun has been shining on them for hours so that they wear a sleepy, half wilted air. Remove basal foliage with *all* blossoms and that from the stem as well with particularly large-leaved species. Next stand the blooms in deep water in a cool place for several hours, keeping the bowls in a dark place. Although tap water can be used I find soft or rain water better for some flowers, particularly *Iris Kaempferi* and the Calcifuges. Burning the ends of milky or mucilaginous sapped plants—like Poppies, Euphorbias and Dahlias prolongs life because it retains the vital juices. It is only necessary to hold the lighted taper for a few seconds to the cut end, or alternatively the tip should be immersed in boiling water for the same length of time. Plants

which cast their petals can often be induced to hold them by this means, but the blossoms must be picked and treated whilst still in the bud stage.

Two or three pieces of lump charcoal dropped into a vase help to keep the water sweet, and I have found oil of peppermint useful with certain flowers for the same reason. Apart from imparting a pleasant mint fragrance to the room, it appears to accelerate transpiration—at any rate vases containing the oil needed topping up more frequently than control vases when tried out last season. One drop of oil is sufficient for half a pint of water.

Further methods of treating individual flowers to prolong life will be dealt with in considering the plants themselves.

Bergenia cordifolia (Syn. *Megasea* or sometimes *Saxifraga cordifolia*) is a coarse perennial with thick, rounded leaves and large inflorescences of white or reddish flowers. The chief value of the plant comes from its earliness (March or April), but the leaves are useful for decoration all the year through.

Polyanthus and Primroses are also early subjects and invaluable for cutting if one can keep birds from pecking the flowers.

Not every one would wish to gather *Fritillaria imperialis*, for the smell—as MR. E. A. BOWLES once wittily described it, comes in a mixture of "mangy fox, dirty dog kennel, the small cats' house at the zoo and Exeter railway station." However it is one of the earliest hardy plants of any stature in the garden and I have used it occasionally. Removal of some of the lower leaves is advisable.

Few water plants are particularly useful for cutting, but the native Marsh Marigold, *Caltha palustris* and its double form *plena*, are not without value in the early spring. A bowl of Kingcups is bright and joyful, although I once read in an old herbal that "you should never take the flowers into a young girl's room, lest she be liable to fits of madness!"

Anemones are favourites for cutting purposes, but often defeat the arranger by refusing to open from buds when brought indoors. This is because an air bubble has risen into the cut end of the stem. To effect a remedy cut the end again and put the stems in a basin of warm water. Now cover the whole affair—basin and flowers—with a cover (cloche, meat cover, tin, etc.), and leave for an hour or two. On removing the cover you will find that every flower will have opened.

Most bulbous flowers are esteemed for cutting and the little Grape Hyacinth is prodigal of bloom, easily grown and well loved in spring time.

Paeonies are most effective for large set pieces, but some are more useful than others for cutting. The old *P. officinalis* makes a good garden plant but shows a tendency to drop its petals indoors. Varieties of *P. lactiflora* and single species such as the Balkan *P. peregrina* are better for cutting purposes.

The Bleeding Heart, *Dicentra spectabile*, finds particular favour

because of its graceful arching habit, dainty flowers and pretty foliage. It is often poorly grown in this country, but will reach 4–5 feet when happily situated and in rich soil, as I saw in a number of the public gardens in Sweden. The plant will also force well.

Lupins are a source of annoyance to many because of a tendency to bud dropping. They do this because the tops of the spikes are not receiving sufficient water. Remove most of the leaves, turn the stem upside down and fill its hollow centre with water. Now place a thumb over the end and invert the whole into a vase of tepid water. You thus effect a siphon which the warm water will start off, and the spikes should last seven to ten days. Delphiniums may be treated in the same way.

Centaurea montana is an old-fashioned plant and the Cornflower heads come in a variety of shades. *C. macrocephala* with stout stems and large yellow and brown heads will last indoors if the foliage is stripped from the stem. Both plants thrive in good garden soil. June flowering Irises are majestic for floor vases and have a character all their own. Gather in the bud state and burn the ends before arranging.

Alstroemerias for some odd reason seem to last longer when only an inch or two of water stands in the vase. Deeply immersed the stems soften. Place one or two pieces of charcoal in the vase. Nowadays the old *A. aurantiaca* is rather superseded by the more colourful Ligtu hybrids, but all are useful for cutting.

Most 'Daisy' flowers can be relied upon for cut flower work. Erigerons, Doronicums, Pyrethrums and Anthemis are the standbys in the garden. Always give them a long drink overnight before attempting arrangement. Anthemis 'Grallagh Gold' is a free-flowering variety with flowers 2½ inches across. Gaillardias are other composites useful for cutting. They can be propagated by seed or division. *Rudbeckia speciosa*, the Black-eyed Susan, blooms in July and has the merit of not requiring stakes. Coreopsis however must receive the support of peasticks if the blooms are to grow straight and clean.

Achillea ptarmica 'The Pearl' gives a clean white flower for posy and "white" groups. It is easy to grow and goes on year after year. Another, *A. Eupatorium* 'Gold Plate,' may be used for drying. If the flowers are stood upside down in a box of powdered alum they will retain their rich gold colouring.

Chrysanthemums are invaluable for cutting, in all their forms and species. The common *C. maximum* has thrown a wide range of varieties, with double, single, semi-double and fringed flowers. *C.* 'Esther Reed' is a well established favourite and there are a number of others in the same category. The *rubellum* varieties come into flower in September and October, and look well with the larger early flowering florist's varieties, or can be arranged alone. I find too that they associate happily with the *Novae Belgii* types of Michaelmas Daisies. 'Clara Curtis' was the first named variety and is a soft shell-pink, while 'Duchess of Edinburgh' is a rich red. Double varieties are frequent, as in the fine bronze 'Tawny Gold.'

Poppies will not last more than a day or so unless treated. They must be gathered in bud, when the colour just shows, and have the ends sealed by burning as already described.

Nothing looks more natural than Water-Lilies in a floating bowl, but alas most of the blooms close tightly about 4 P.M. They can be kept open by dropping a spot of paraffin wax at the base of each petal. This can be coloured with red ink or a vegetable dye to blend in with the colour of the flowers.

Astilbes should be grown in rich soil and a moist position, but otherwise present no cultural problems. Both flowers and foliage are strikingly handsome, the former being available in various shades of pink and red and also white.

Most of the Sunflower family (Helianthus) are too coarse for house decoration, and a number do not cut well. *H. sparsifolius*, 'The Monarch,' is a plant par excellence, the blooms often lasting four to five weeks without a great deal of care and attention. As a back of the border perennial (4–6 feet) it is invaluable, although not always hardy in some districts. The wise gardener will lift a few tubers in autumn, storing those under ashes or with his Dahlias. Heliopsis is another golden-flowered perennial worth growing and lasts two to three weeks when cut.

Catananche caerulea major I would not be without—the flowers are so graceful with their mauve florets and silvery "everlasting" backs. It is a good plan to grow two clumps of the plant, allowing one to flower at the normal time in July, but shearing off the buds of the other so that it receives a set-back and comes into bloom in August and September.

Amongst autumn perennials Heleniums and Michaelmas Daisies are well known and tried. The *Novae Angliae* forms of Aster do not lend themselves to cut flower work as well as the *N. Belgii* kinds, because of a tendency to close their florets in artificial light. In order to preserve the blooms as long as possible strip most of the foliage from the stems.

Red Hot Pokers are other good subjects for the summer and autumn, particularly the small-flowered *gracilis* forms and the variety 'Erecta.' This has the merit of never appearing untidy since the lower flowers do not wither when spent, but turn upwards to meet the younger blossoms.

Silver-leaved plants are in demand for modern themes in flower arrangement. *Veronica incana* or *Artemesia* 'Silver Queen' look particularly well in association with the red-leaved and scarlet-flowered *Lobelia fulgens*.

I am afraid this brief survey only draws attention to a few of the hardy plants useful for cut flower work. Others worth noting are *Scabiosa caucasica*, various Campanulas, Armeria, Aruncus, Echinacea, Phlox, Gypsophila, Aconitum, Cephalaria, Cimicifuga, Dianthus, Echinops, Eryngium, Eremurus, Eupatorium, Geum, Heuchera, Liatris, Physalis, Salvia and Solidago.

NEW ROSES

Harry Wheatcroft

(*Lecture given on June* 23, 1953; MR. G. W. LEAK, V.M.H. *in the Chair*)

I AM sometimes called from my home in the industrial Midlands to give a little talk on Roses to one of the horticultural societies, but to talk to such a distinguished audience as is assembled here to-day is something quite different for me. All the world knows that members of The Royal Horticultural Society know far more about plants and flowers than those of any other society of its kind in the world. In fact, having shown at the R.H.S. for perhaps thirty years, I can assure you that much of my knowledge has been gained from the very enthusiastic amateurs who go to the shows and very kindly give instruction and advice to the poor professional.

I believe that there are as good fish in the sea as ever came out, and as the National Rose Society has received upwards of 800 new varieties of Roses since the war, it is obvious that the hybridists of the world are very keen to provide new Roses for your delight and enjoyment. Had I been a patient and painstaking sort of fellow, I could have planned to give you a description of the 800-odd varieties, but time prevents that. I also believe that you know people only by living with them. That also applies to Roses. You only know Roses by living with them and observing their habits and their peculiarities, and it takes a year or two before you can make decisions about them. So, if I do not talk about the 800-odd varieties this afternoon, it will also be because I do not know much about all of them. I propose to confine my observations to varieties that I know quite intimately, varieties that we have grown for two, three or four years; and I hope that my observations and information will correspond with yours if you have grown some of the same varieties.

The first Rose that I want to mention is, of course, 'Peace.' It has become one of the greatest "standard" varieties in this country. It has a magnificent habit of growth. The wonderful flowers, far bigger than any produced with ordinary garden cultivation before, combined with very healthy foliage, have put it right in the forefront of modern Roses. A very great debt is owed to the raiser, FRANCIS MEILLAND, who lives in France, for having brought the variety into being.

I shall try to deal with the Roses according to the years during which they were introduced. Some of my references will be brief, but most of the varieties have received some award from the National Rose Society or The Royal Horticultural Society, and that should be sufficient guarantee that they have qualities which are worthy of attention.

Another variety introduced in 1947, also from abroad, is 'Charles Gregory' which is a lovely vermilion colour with a yellow reverse

shaded with red. It is an intense and lovely Rose but rather lacking in petalage.

A red Rose of the same year is 'Poinsettia,' which is steadily gaining favour in this country. It also came from abroad and it grows well, has reasonable fragrance and, I think, is a satisfactory garden Rose.

In the same year we had the remarkable introduction of a completely new break in Polyanthas or Hybrid Polyanthas. This was 'Fashion' which has a lovely soft salmon colouring. It grows quite well and is rapidly coming into the forefront of the Polyantha Roses. We have many reds and pinks in the Polyantha class, but 'Fashion' has introduced a new colour break which is welcome. Time will tell whether foliage and growth are sufficient to put it on the really top plane, but this I doubt.

Another variety introduced in the same year is 'Dusky Maiden,' very aptly named. Here is a nice Hybrid Polyantha Rose, very dark in colour with the kind of sheen that one sees on ripe peaches and grapes. This lovely powdery bloom on the petals makes it most attractive.

'De Reuter's Herald,' which received the Gold Medal in the same year, has bright scarlet single flowers in huge clusters. It is not a particular favourite of mine, but it caught the eyes of the judges.

In 1948 we had one or two very interesting introductions. One was 'Michelle Meilland,' another Rose from the hybridist of 'Peace'; blush-pink shaded with coral on a gold base. It is a lovely Rose, with exquisite form, long petals and nice fragrance. It makes a happy bush and is a first-class garden variety.

One of my favourities—surely the most heavenly Rose on earth—is 'Charles Mallerin.' It is a Rose of excellent full growth and colour and, above all, the most wonderful fragrance. It has a fault, like all human beings and Roses. It is not as free-flowering as we should like. However, it is a lovely red Rose, and the more sunshine it has the more the contrast is enhanced between the dark outer petals and the lighter effect in the middle.

'Marcel Gret' was introduced at the same time, a distinctive golden-yellow Rose with a tight bud. This is one of the seedlings of 'Peace,' and although not so big it is grand for bedding. In the same year came 'Virgo,' a very exquisite white Rose and a wonderful grower. It has been awarded a Trial Ground Certificate and the Gold Medal of the National Rose Society. I shall never forget the moment when I first saw this Rose.

During the war years the English growers stopped producing Roses and attempted to grow foodstuffs. When the war ended we had about 5,000 Rose trees; when it began we had half a million. But in France and elsewhere on the Continent they retained their Roses in spite of the occupation. Shortly after the war ended I hastened to Lyons, the centre of the Rose-growing area in France, to see my friends and to find out what they had been doing. I shall never forget that morning when I arrived very early by plane from Paris. They had cut quite a number

of their new varieties for us to see, and had placed in their lounge a huge bowl of 'Charles Mallerin' and one of 'Virgo.' It was a very great joy to see these new Roses.

There was also a lovely bowl of 'Suzon Lotthe,' which is a hydrangea-pink colour with a beige background. Although it has a most delightful scent and is a very vigorous grower, it does not particularly like wet weather, which causes spotting of the petals. As this is the year for the Test Matches, we can no doubt expect quite a lot of rainy weather!

A home-grown variety which gained the Gold Medal that year was 'Prima Donna,' a salmon-pink Rose. The description in the raiser's catalogue was "Blooms large and well-formed." I expect that most of us have met prima donnas who answered the same description.

Another new Rose of that year, raised by GAUJARD of Lyons, was 'Opera,' which I think is the best variety that he has bred. It is a lovely copper-orange, a wonderful grower and has blooms of perfect shape. Although it has good glossy foliage, it takes mildew slightly in the autumn, but that can be kept in check and remedied.

From America the same year came another very outstanding Polyantha Rose, 'Goldilocks.' Its colour is not as deep as we should like, being rather a pale primrose, but it is certainly the best yellow up to now. As you know, we are very limited in that colour range, but there are developments taking place and we are longing for the time when we have a real buttercup-yellow.

Another introduction was a very nice Hybrid Polyantha from France, 'Alain,' a deep red with brightness in the centre after the style of 'Charles Mallerin.' It is destined to be one of the very popular Polyantha Roses as it is nice and short in habit, up to 2 feet high forming a very compact bush, and that I think is the type of Rose we want for general planting.

Another introduction in 1948 was 'Lady Eve Price' which is quite a new break in Roses. It is tremendously vigorous, growing 3 to 4 feet high and covering itself with large semi-double cerise flowers and healthy foliage which stands up pretty well throughout the winter. It makes an attractive bush, and is quite a new break as far as growth is concerned.

Another yellow Polyantha is 'Danish Gold.' Many of us saw the Coronation or have seen the coloured pictures of the gold coach, and hence we have some idea of what gold looks like. 'Danish Gold' which is from the great grower POULSEN, does not live up to its name. It is a pale Rose but it is not a golden Rose and from my experience I should not recommend it.

From America that year came 'Charlotte Armstrong,' red flushed carmine, a very strong grower with a good neck, long buds and fragrance. I saw it at Lyons this season with MR. ARMSTRONG, who had come over from America to look at Roses. I am sure that he felt very proud of seeing his Rose there.

Incidentally, one of his Roses gained the Bagatelle award this year,

and repeated this success at Geneva. It is called 'Magave.' I understand that 'Magave' is a desert somewhere in California, and the colours of the Roses—this sounds like a catalogue description—represent the colours that one sees in the desert when the sun is setting in the West.

In 1949 we introduced a Rose called 'Tahiti.' That makes you think of raffia dresses and whatnot! It is a charming Rose very similar in colour to 'Peace,' possibly a shade more yellow, and it has a most heavenly scent, which is really powerful. Everybody always wants a Rose with scent, and 'Tahiti' really fills the bill. It has a fimbriated edge, which makes it quite unusual, and the shape in bud is good. It opens to a very full flower, and from its yellow-pink edge the pink suffuses right through the yellow flower, until in the end it is very nearly a pink Rose. Another outstanding characteristic is that it is a wonderful grower, and I consider it highly satisfactory for anybody's garden.

The year 1950 saw a sensational introduction from our friend in Germany, WILHELM KORDES. I think he is, possibly, the greatest authority on Roses in the world to-day. He produced that variety which caused a stir, now known as 'Independence.' It is a completely new break in colour. 'Independence' is a Hybrid Polyantha or a Floribunda Rose. There has been a lot of mixing up of the families of Roses. POULSEN started about thirty years ago crossing Hybrid Teas with Polyanthas, and that has been going on and on and on, and now it is becoming difficult to define clearly which group a Rose should be in. I think that eventually all cluster Roses will be called Floribundas, and the dwarf Polyanthas and Hybrid Polyanthas, which are cluster Roses, will hence be called "Floribundas."

When the raiser saw 'Independence' it was a terrific thrill. I have seen many hundreds of new varieties of Roses in the last fortnight or three weeks, and the amazing influence of 'Independence' as a parent is evident throughout the Continent. During the war years the Bagatelle Show was carried on and an earlier variety of 'Independence' called 'Sondermeldung' was put in the Bagatelle Trials and received a Gold Medal. It was boycotted by the French at the time, but I am sure that a good many flowers found their way to many parts of France and were used for pollinating. The characteristic colour is such that it can be seen that many new varieties owe their origin to this Rose.

One of the latest introductions is 'Radar' (a Hybrid Tea), a cross between 'Independence' and 'Charles Mallerin.' It is a nice full Rose and it has what 'Independence' lacks—perfume. For that reason it may have a certain vogue. It will certainly have an appeal because fragrance in that colour is something distinctly new.

Another wonderful Rose, introduced in 1950, was 'Monique.' I have no hesitation in saying that it is in the first half-dozen Roses of to-day. It has a long well-shaped bloom, with the 'Butterfly' characteristics, but richer colouring. It is a very good grower, making a bush 4 to 5 feet high that the ladies of the house can really slaughter for

arrangements. The blooms have enormous stems, and although the old man may be upset about the slaughter, the bushes react well. It also has fragrance and plenty of petals, and cannot be "faulted." An elegant Rose, particularly for cutting, it looks just as well growing in gardens.

'Monte Carlo' is a lovely shape. It is fragrant and has nice foliage. It is a little reminiscent of 'Peace' but it has a characteristic of its own as it is shaded orange rather than pink. It is quite a good Rose for cool greenhouse work in this country. Awarded the Gold Medal of the National Rose Society and the Trial Ground Certificate, it is a first class variety.

During my visit to the Riviera we went to see DR. ACARDI, the famous breeder in Italy. Unfortunately the whole of his place was wiped out during the war, and although he is getting old and a bit downhearted, he was very pleased to see us. He spoke good English and we had an enjoyable time looking at his Roses and some of the ones raised by what he calls "his pupils," people to whom he has taught the art of hybridizing. They are definitely going to make a very great contribution to the Rose world by bringing out some extraordinarily fine new varieties. They have done a lot of work with Hybrid Teas and Polyanthas and also with miniatures. I saw hundreds of new miniature Roses in their seedling stage; no higher than 9 inches or 1 foot, they were complete balls of flower. There were hundreds upon hundreds of flowers, both double and single, some of them being a very good shape. They were delightful. The great trouble will be for the poor nurseryman who attempts to propagate them, because they are all flower and no wood. But the men of the land will try and try and try, and I am sure that we shall find a way of bringing these to the market. At the present time, they are just seedlings; these are things that will come in several years' time.

The glory of Roses from the point of view of a grower is that you are always thinking of what is going to happen this year, next year, sometime, and although it may never happen, as long as you are hopeful it does not matter.

Other interesting introductions about 1950 were the varieties 'Berlin,' 'Bonn' and 'Elmshorn.' 'Berlin' might be classed as a Hybrid Musk. It has a very brilliant red colour and is useful for the background or a shrubbery. The time is coming when many Roses will have to be treated as shrubs and put into the shrub border where they will grow 5 to 6 feet high very well. 'Bonn' is similar in type with the shade of 'Independence,' new in this type of Rose. 'Elmshorn,' a very interesting variety, is a semi-climber and a perpetual-flowerer, flowering on all the wood it makes. It is a nice deep pink in colour, the flowers come in clusters, and it grows really well. I have seen it in the gardens of the Plantenblumen in Hamburg. When planted 3 or 4 feet apart, it gives complete coverage.

Another Rose introduced at the same time which is proving itself

in this country is 'Eden Rose.' For people who like a really good shaped bloom, this Rose is the answer. The colour is carmine-pink, and it has a lovely sized bloom, especially in the autumn. It is a strong grower with very satisfactory foliage.

There have been great advancement in the bi-colour range. You may remember 'Juliet.' One or two of my generation will remember her, a bi-colour rather prone to black spot, and now extinct; and I think it is a good job too because of the bad black spot.

'Queen Alexandra,' raised by McGredy's in about 1918, was one of the first really brilliant bi-colours. MR. JOHNSTONE of McGredy's was with me in France when we met PAPA MEILLAND, who has been growing Roses for about sixty years. The latter recalled what a thrill it was the first time he saw 'Queen Alexandra,' and what a great joy it was to growers to get that variety.

One of the great things about Roses is, of course, their international aspect for they give pleasure all over the world. Anybody's contribution, whether in this country or abroad, gets mixed with others and something more beautiful is produced.

Perhaps the hottest bit of colour in bi-colours to-day is 'Dr. Valois.' It is a semi-double Rose, and in the sunshine it is a most attractive and brilliant variety. Roses can, of course, always satisfy every whim or wish as far as colour, growth and size are concerned. That is one reason for the popularity of the Rose, as well as the fact that it grows in spite of whatever you do to it.

Another bi-colour is 'Tzigane,' which is a good strong-growing variety. I have seen a lot of 'Tzigane' on my visits to friends abroad, but they do not come up to the type that we grow here. Although the sunshine will give colour, our peculiar climate allows more time for a Rose to develop, and if we have reasonable luck with the weather—and we do, of course, as our shows give evidence—'Tzigane' is really a very lovely Rose. I have a bed of it at home, and I am very delighted and thrilled with it (Fig. 105).

Red Roses are what everybody wants. All the hybridists of the world are busily seeking the best red Rose. Some would say that we have not a good red Rose yet in spite of the very lovely varieties already introduced. I believe that in this country at the moment 'Ena Harkness' reigns supreme as a red, with the new variety 'Mme Louise Laperriere' rapidly overtaking it, for it has fragrance, colour and is the freest-flowering Rose of all. On the Continent down as far as Lyons it is good, but the strange thing is that a Rose takes two or three years to bed down in a different country. In France this has proved true with many of the American and British varieties. I spoke to my French friends about 'Ena Harkness' and they tried it and at first assumed—possibly correctly—that I did not know much about Roses; but it is beginning to prove itself now, and I was very pleased to see thousands of 'Ena Harkness' growing on the Continent and looking well.

The growers of the world also have an interest in finding new

varieties for greenhouses. The ladies present may recall that they went to the altar with 'Ophelia,' 'Madame Butterfly' or 'Madame Abel Chatenay.' Only a limited number of varieties do well under glass—ten at the most and probably only five really good ones. Growing under glass is commercial work, for the growers have to pay for the coal, and a Rose in order to earn its keep must be prolific in growth and have very good cut-flower characteristics. It is a market that the hybridist is very anxious to develop. In America if the hybridist produces a good Rose for cutting, he stands a chance of making a little money, so there is a good deal more concentration in this direction. We have not as much interest in this country, but 'Happiness,' raised by MEILLAND, has the most wonderful characteristics under glass, and although it has been in commerce for only three years, it is the most popular red Rose grown. It is forced in France, and at Antibes there are hundreds of thousands of plants grown under glass. It has plenty of substance and travels marvellously. The blooms are sold and despatched all over the Continent, where 'Happiness' has almost superseded every other variety.

'Concerto,' a Hybrid Polyantha, is a geranium-coloured Rose if one can go to another flower to describe a Rose. It has a very fiery colour and is a good grower. I am sure it will have a good future as it really reproduces itself very well indeed and has good foliage. It has one of the highest ratings at the Trial Ground.

'Pigalle' is a Rose on which many of you may frown, but many also can see the beauty in it, particularly when it is full blown. At the end of its life it is a deep mauve colour, like the Roses in old Dutch paintings. It is a wonderful grower, giving any amount of flowers, and it is good for the ladies who want a touch of the unusual in their decorations. It is quite nice for bedding too, but you would be rather surprised to hear what some of my colleagues on the Council of the National Rose Society have said about it.

This year has seen the introduction of another new shade in Roses; the beginning of a mauve Rose. When it is disbudded—it often has four flowers—it gives an elegantly shaped bud, and is certainly a delightful new shade. We showed a few blooms at Chelsea, and, from its reception there, I am sure it will be popular for decoration. At the moment it is a Rose without a name.

'André le Troquer,' which was introduced two or three years ago, is a lovely orange shade, and full. It carries on well, particularly in hot sunny weather. 'André le Troquer' is very worth-while.

'Grandmère Jenny' (Fig. 104) is possibly my favourite, and you may wonder why. It is a most wonderful Rose. It is a child of 'Peace' and I think that if I were planting a bed I should plant this variety because I should get considerably more Roses than with 'Peace.' Although it has not the fullness of 'Peace' it is full enough. It becomes a deep honey-yellow with a very definite pink suffusion on the petals. The growth is simply amazing. I have a bed of 100, now about 4 feet high. It comes again very quickly; by the time the first blooming is over it is beginning to

make growth again, and that is what you want, of course. You cannot have too much of a good thing.

One section which has not been developed as much as some of the others is that of the climbing Roses. Probably the best new climber at the moment is one from 'Charles Mallerin' called 'Record,' which is orange-scarlet, more scarlet than orange. It grows up 7 or 8 feet, and gives a wonderful mass of colour.

But the hybridist, knowing the needs of the grower, and knowing that we should all like our ramblers to bloom the whole of the summer, is trying to make them do that. There are many varieties of *Kordesii* (raised by MR. KORDES) on trial at the trial grounds of the National Rose Society. Out of thirty varieties, fifteen awards have been made and the Society is very much impressed by them. However, it is not the intention of MR. KORDES and ourselves to put them out until we are really sure that we have something which is a very marked advance, and the seventeen or eighteen varieties (and there will be new ones the following year) will not be introduced until that time. Their great virtue will be their perpetual-flowering characteristics. Those which are not, in spite of their beautiful colour, will not be put into commerce. But in the next ten years we can look forward to perpetual-flowering ramblers of all colours, from white to deepest crimson and some with rich perfume. They are also remarkably free from disease. And this brings me to a point I want to make. We are extremely fortunate in England. In spite of the weather, we are able to grow Roses easily. If you knew the trouble that they have in Europe with spraying, you would find it almost disheartening. In England we can grow Roses easily and we can grow them well.

There are many varieties which I have omitted, but time is running out. And now a word about the future. We can look forward in the next ten years to a great development in new Roses. All over the world hybridists are very busy, thanks I believe to some form of patenting applied in America and in Europe, which has given the hybridist initiative and enthusiasm because he sees that he may be able to reap a reward for his efforts. Within the last three years in California, which is a wonderful district for hybridizing because of its climate, tremendous developments have been made. More than twelve new hybridizing stations have been established, the men concerned having decided that hybridizing will be their life's work and that they will go for the glittering prize which awaits the person who produces the best and most successful Rose. This means that hundreds of varieties will come into the trial grounds of this country, America, France and Germany, because varieties to-day are tested almost universally. Although many will start the race, few will finish, in first, second or even third places.

This means that in a few years the Roses that have received awards from the world's leading societies will be Roses upon which you can place every confidence because they will have been in competition with others of a very high grade. That is very satisfying. It proves the need

and the worth of specialized societies to sort out the varieties for you.

At Geneva this year an unnamed variety which was awarded the Gold Medal for the best Hybrid Polyantha Rose came from Germany. It grows 4 feet high and has terrific heads of bloom. A strange method of awarding points has been employed to ensure vigorous growth and freedom from diseases. It has encouraged breeders to produce a large tree. On this basis, the German variety won the day. I believe that the international and national societies devoted to Roses throughout the world have now reorientated their ideas about what they mean by "growth." A very wonderful Polyantha which will grow 2 feet high and 2 feet wide, is the ideal thing in a bed, but at the present time, owing to the points classification employed, it loses the race. It is not always the tallest Rose that really fills the bill. Such varieties as 'Red Favourite' and 'Tantau's Delight' are of the ideal bedding type.

It is heartening in these troubled and distressed times to know that in the world of Roses so much development is taking place, a development of beauty which will bring joy and pleasure to all of us.

NOTES FROM FELLOWS

Callistemon citrinus splendens

THE Red Bottle-brush, *Callistemon citrinus splendens*, shown in Fig. 107, was planted in the front garden of MR. E. C. COOK'S house at Feltham, Middlesex, in 1946, and has survived there without any protection in spite of having a large piece broken off by snow in the winter of 1951. Last July, when the photograph was taken, the plant astonished many who saw it and not a few stopped to inquire its name. This remarkably showy Bottle-brush is evidently hardier than is commonly supposed and might well be tried more often. The less striking, though quite attractive, *Callistemon speciosus* has survived for twenty years against a south wall at Wisley, and although it was once cut to the ground by frost, it is now 5 feet high again.

Callistemon citrinus was so named by W. CURTIS because when crushed the leaves emit a smell similar to that of the leaves of the Lemon tree. The variety which is appropriately called *splendens* is of garden origin. It was raised many years ago at Kew from seed received as *C. laevis* from an Australian source which cannot now be traced.

A. SIMMONDS

WISLEY TRIALS, 1953

PERENNIAL LUPINS

The Council of the Royal Horticultural Society has made the following awards to Lupins after trial at Wisley, on the recommendation of the sub-committee of the Floral Committee A. The number in brackets after the description of the variety is that under which it was grown in the trial.

GAIETY GIRL. (Raised, introduced and sent by Messrs. Bakers Nurseries, Ltd., Codsall, Wolverhampton.) **F.C.C.** May 27, 1953.—Described R.H.S. JOURNAL 77, page 26 (**A.M.** 1951). [12]

CHARMAINE. (Raised, introduced and sent by Messrs. Bakers Nurseries, Ltd.) **A.M.** May 27, 1953.—Plant vigorous, not woody, large dark green foliage. Spikes 2½ inches in diameter at base, 16 inches long. Standards Chrysanthemum Crimson (H.C.C. between 824/1 and 824/2); wings Vermilion (H.C.C. 18/2). Flowers held well above foliage. [8]

FREEDOM. (Raised, introduced and sent by Messrs. Bakers Nurseries Ltd.) **A.M.** May 27, 1953.—Described R.H.S. JOURNAL 77, p. 26 (**H.C.** 1951). [37]

HEATHER GLOW. (Raised, introduced and sent by Messrs. Bakers Nurseries, Ltd.) **A.M.** May 27, 1953.—Plant vigorous, not woody, compact and upright, large dark green foliage. Spikes 2¾ inches in diameter at base, 16 inches long with individual flowers large. Standards Doge Purple (H.C.C. 732/3) with large rosy-bronze blotch; wings Petunia Purple (H.C.C. 32) veined Doge Purple (H.C.C. 732/3). [18]

ROSE QUEEN. (Raised, introduced and sent by Messrs. Bakers Nurseries, Ltd.) **A.M.** May 27, 1953.—Plant vigorous, not woody, large medium green foliage. Spikes 3 inches in diameter at base, 18 inches long. Standards Solferino Purple (H.C.C. between 26/2 and 26/3) tinged with Roseine Purple (H.C.C. 629/2) with a blotch of creamy white at base; wings a soft shade of Solferino Purple (H.C.C. 26/3). [25]

LILAC TIME. (Raised, introduced and sent by Messrs. Bakers Nurseries, Ltd.) **H.C.** May 27, 1953.—Plant vigorous, not woody, compact habit, medium to dark green leaves. Spikes 3 inches in diameter at base, 21 inches long. Standards Mauve (H.C.C. 633) with margins flushed apricot which turns to white with age; wings Mauve (H.C.C. 633); both standards and wings turn with age to Petunia Purple (H.C.C. 32). [23]

NELL GWYN. (Raised, introduced and sent by Messrs. W. H. Simpson & Sons, 209 Monument Road, Birmingham 16.) **H.C.** May 27, 1953.—Plant vigorous, not woody, compact habit, medium green leaves. Spikes 2½ inches in diameter at base, 16 inches long. Standards opening soft rosy salmon changing to Spiraea Red (H.C.C. 025/1) with yellow blotch at base; wings opening Begonia (H.C.C. 619/1), deepening to bright rosy salmon flushed orange. [11]

AQUILEGIAS

Twenty-six stocks were received during 1951 for trial at Wisley. The trial was sown on April 8, 1951, in pots. The seedlings were pricked out into boxes and grown on in cold frames. The trial was planted out in the summer of 1951. The sub-committee of the Floral Committee A inspected the

trial on May 27, 1953, and their recommendations for awards as given below have been approved by the Council of The Royal Horticultural Society.

The number in brackets after the description of the variety is that under which it was grown in the trial.

Flowers White

SNOW QUEEN. (Raised, introduced and sent by Messrs. Waller Franklin Seed Company, Guadalupe, California, U.S.A.) **A.M.** May 27, 1953.—Plant vigorous, 27 inches high, branched; flowers 3 inches in diameter, single, spur 2 inches long, sepals, petals and spurs white. [1]

Flowers of Orange Shades

ORANGE AND SCARLET SHADES. (Raised, introduced and sent by Messrs. Waller Franklin Seed Company.) **H.C.** May 27, 1953.—Plant vigorous, 26–30 inches high, branched; flowers 2½ inches in diameter, single, spur 1⅗ inch long, sepals and spurs Jasper Red (H.C.C. 018) overlaid with Rhodonite Red (H.C.C. 0022), petals Aureolin (H.C.C. 3/1). [10]

Flowers of Blue Shades

BLUE KING. (Sent by Messrs. Watkins & Simpson, Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** May 27, 1953.—Plant vigorous, 27 inches high, branched; flowers 4 inches in diameter, single, spur 1½ inch long, sepals and spurs Royal Purple (H.C.C. 834/2), petals white. [6]

SKY BLUE. (Raised, introduced and sent by Messrs. J. R. Pearson & Sons, Ltd., Lowdham, Notts.) **H.C.** May 27, 1953.—Plant vigorous, 24 inches high, branched; flowers 3½ inches in diameter, single, spur 1⅘ inch long, sepals and spurs various shades of sky blue including Sea Lavender Violet (H.C.C. 637/1) with some flushing of Amethyst Violet (H.C.C. 35/1), petals white. [4]

Flowers of Mixed Colours

LANGDON'S RAINBOW. (Raised, introduced and sent by Messrs. Blackmore & Langdon, Twerton Hill Nursery, Bath, Somerset.) **A.M.** May 27, 1953.—Plants vigorous, 28–33 inches high, branched; flowers 3½ inches in diameter, single, spur 2⅕ inches long, sepals and spurs good mixed colours including white, yellow, apricot, pink, red, scarlet, purple, violet, blue, petals white and yellow. [25]

MRS. SCOTT ELLIOTT'S. (Sent by Messrs. Watkins & Simpson, Ltd.) **H.C.** May 27, 1953.—Plant vigorous, 24–30 inches high, branched; flowers 3½ inches in diameter, single, spur 1⅖ inch long, sepals and spurs mixed colours, including white, yellow, apricot, red, purple and blue, petals white and yellow. [21]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1953

Begonia Boweri A.M. May 19, 1953. An uncommon rhizomatous species. The asymmetrical leaf is ovate and acuminate, 2 to 3 inches wide, bright green with irregular triangular black markings near the margin, which is set with white bristly hairs. The erect petiole is bright red, bristly, 4 to 5 inches tall. The very small white flowers are carried on long branching stems. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, King's Lynn, Norfolk.

Begonia Rex 'Iron Cross' A.M. May 19, 1953. The roundish leaf of this interesting variety is 8 inches across, and has a pointed tip and an acute lobe on one side. The surface is strongly bullate and covered with erect bristles. The colour is bright grass green, marked by four or five rectangular bronze bars radiating from the centre. Exhibited by L. Maurice Mason, Esq., Talbot Manor, Fincham, King's Lynn, Norfolk.

Cordyline australis A.M. June 23, 1953.—A New Zealand tree reaching a height of 40 feet, with one or more erect stems each bearing a dense terminal crown of narrow, leathery leaves up to 3 feet long. The inflorescence exhibited was a huge pyramidal panicle 4 feet high and a yard across, made up of a great number of patent branches each bearing many 10-inch-long spikes of small, ivory-white, strongly odorous flowers. Exhibited by R. Olaf Hambro, Esq., Logan, Stranraer, Wigtownshire.

Eucalyptus coccifera A.M. May 19, 1953. One of the more hardy species, native of Tasmania. The glaucous grey-green leaves are alternate, lanceolate or elliptic, 2 to 3 inches long. The flowers, with their conspicuous bunches of creamy-white stamens, are borne in axillary clusters of five or six. Exhibited by Sir Ralph Newman, Bt., Blackpool, Dartmouth, S. Devon.

Jacobinia suberecta A.M. June 23, 1953. This uncommon herbaceous plant was introduced from Uruguay in 1909, and is only suitable for the warm greenhouse. The stems are weakly erect, over a yard high, and bear pairs of silky-tomentose, ovate leaves. Each branch bears a terminal clustered inflorescence of erect, narrow-tubular orange flowers $1\frac{1}{2}$ inch long. Exhibited by The Director, Royal Botanic Gardens, Kew.

Ligularia macrophylla A.M. July 7, 1953. A large and handsome herbaceous perennial most suitable for a moist place in the larger garden, where it has plenty of room to develop its clusters of bold leaves with ovate blades 2 feet in length. The stout, erect stems branch above into pryamidal heads of densely packed flower-heads, each of which has about eight disc-florets and three Canary Yellow (H.C.C. 2) rays about $\frac{3}{5}$ inch long. Exhibited by The Director, Royal Botanic Gardens, Kew.

Lilium × 'Enchantment' A.M. July 7, 1953. A brightly coloured hybrid Lily raised by Mr. Jan de Graaff at Portland, Oregon. The tall stems are stiffly erect and well covered with linear-lanceolate leaves 4 to 5 inches long. The inflorescence exhibited had sixteen flowers well disposed on spreading pedicels 3½ inches long. The Nasturtium Red (H.C.C. 14) perianth-segments are 3½ inches long, the inner 1¼ inch wide, the outer 1 inch wide, spreading and recurving strongly at their tips, and finely black-spotted. Exhibited by The Commissioners of Crown Lands, Windsor Great Park, Berks (Fig. 112).

Lilium 'Marlyn Ross' A.M. May 19, 1953. A very striking hybrid raised from a cross between *L. dauricum* and *L. sulphureum* made in 1947 by Mr. D. J. Ross of Hawera, New Zealand, who kindly presented bulbs to Wisley. The plant produces stout erect stems about 3 feet tall, covered with dark green lanceolate leaves 3½ inches wide. Seven or eight erect flowers are carried in the inflorescence, each on an ascending pedicel 3 inches long. When fully expanded the flower has a flattish cup shape and is 2½ inches high and 6½ inches wide. The outer perianth segments measure 4 inches long by 1 inch wide; the inner 4 inches by 1½ inch. The colour is Sulphur Yellow (H.C.C. 1/1–1/2), with a median orange stripe and even maroon spotting. Exhibited by The Director, R.H.S. Gardens, Wisley, Surrey (Fig. 113).

Lychnis × Haageana A.M. July 7, 1953. A hybrid raised from the cross *fulgens* × *coronata*. In the form exhibited it is a robust plant 2 feet tall, the stems branching and carrying flattish heads producing a succession of flowers, each 2 inches across, with glowing Indian Orange (H.C.C. 713) corollas and deep bronze-red calyces. Exhibited by The Director, Royal Botanic Gardens, Kew.

Notholirion campanulatum A.M. June 23, 1953. A handsome Himalayan herbaceous plant allied to *Lilium*. The bulb produces a cluster of ligulate leaves a foot long, from among which rises a leafy stem a yard high bearing reduced leaves and (in the specimen exhibited) sixteen open bell-shaped flowers 2 inches long. The fleshy oblanceolate perianth-segments, coloured Erythrite Red (H.C.C. 0027), have deep purple, pouched bases. This plant has been established at Logan for over thirty years, and has withstood nearly twenty degrees of frost without protection. Exhibited by R. Olaf Hambro, Esq., Logan, Stranraer, Wigtownshire.

Paeonia suffruticosa 'Mrs. George Warre' F.C.C. May 19, 1953. This fine Tree Paeony received the **A.M.** on May 20, 1952, and it is described and illustrated in the JOURNAL, **77**, p. 423, and Fig. 151 (November 1952). Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea, Sussex.

Pyracantha Rogersiana A.M. June 23, 1953. The award is given to this well-known species for its value as a flowering shrub. When the long growths are wreathed in little bunches of creamy-white flowers set among young pale green leaves it is highly ornamental. The A.G.M., which it received in 1937, marks it as one of the best

berried shrubs. Exhibited by Col. Lord Digby, D.S.O., M.C., Cerne Abbey, Dorchester.

Rhododendron diaprepes 'Gargantua' A.M. June 23, 1953. A single plant of this variety was raised at Tower Court in 1923 from seed of a plant of *R. diaprepes* (Forrest 11958). It is of considerable botanical interest, being the only triploid (2n = 39) recorded by Dr. E. K. Janaki Ammal after a cytological study of 360 species. The larger size of all its parts makes it easy to distinguish from this type. In the specimen exhibited the obovate-oblanceolate leaves were fully 8 inches long, with recurved margins and rounded, mucronate tips; the flower 5 inches across, of firm, waxy texture, the lobes widely spreading, fimbriate and recurved, in colour white with a green flush at the base of the tube. The flower is strongly and pleasantly scented. Exhibited by Mrs. R. M. Stevenson, Tower Court, Ascot.

Rhododendron 'Romarez' A.M. July 7, 1953. Raised at Tower Court from a cross between *Kyawi* and *Griersonianum*, this hybrid has the advantage of flowering some five weeks later than 'Tally Ho' which is of similar colouring. 'Romarez' has fine long-elliptic leaves up to 8 inches long, dark mat-green above and covered with brown indumentum beneath. The well-shaped truss contains eight to twelve funnel-shaped flowers flared at the mouth, 3½ inches across, and coloured Geranium Lake (H.C.C. 620). The stamens and style are dark ruby-red. Exhibited by Mrs. R. M. Stevenson, Tower Court, Ascot, Berks.

Rose 'Frühlingsduft' A.M. June 9, 1953. A very attractive hybrid raised by Wilhelm Kordes in Germany. It forms a well-shaped bush with deep bluish-green leaves composed of seven evenly-serrate obovate leaflets a little over an inch long. The flower is 4 inches across, semi-double, and has concave, broadly-obovate petals coloured Carmine Rose (H.C.C. 621/2) passing to Canary Yellow (H.C.C. 2) at the base. Its charm is greatly enhanced by a strong and most agreeable scent. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking.

Sprekelia formosissima A.M. May 19, 1953. This is the solitary species of a genus related to Hippeastrum, native of Mexico and Guatemala. The bulb produces several narrow leaves about a foot long and an erect scape bearing a solitary flower. The curiously shaped, dark crimson perianth is composed of three upper spreading and recurving segments and three lower which are rolled together to form a horizontal tube enclosing the staminal filaments. Exhibited by R. E. Thoday, Esq., St. John's College, Cambridge.

Staphylea holocarpa rosea A.M. April 28, 1953. An unusual and attractive small tree, native of China. The leaf is composed of three oblong or oblong-lanceolate leaflets 2 to 4 inches long. The pale rose flowers, each ½ inch long, are arranged in drooping axillary panicles about 3 inches long, and open as the pale green leaves begin to expand. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

BOOK NOTES

"Sweet Peas." By E. R. Janes. Illus. 192 pp. (Ward Lock & Co.) 15s.

The great increase in growing Sweet Peas for decoration and for exhibition use is reflected in the number of good books on the subject now available compared with in the years preceding the war when there were few, if any, books in print. It is fair to say that the volume under review is the most comprehensive of all the new books. The author has the inestimable advantage over most writers of "Single flower" monographs in having a lifetime's experience, embracing practically every field of horticulture. Trained in the west country, he was in charge of Lord North's gardens at Wroxton Abbey; on the teaching staff of University College, Reading; and was, for thirty years, responsible for the nurseries and exhibitions of Messrs. Sutton & Sons. He therefore brings to his subject great width of experience, which in turn is apt to make his text discursive and reminiscent. Nevertheless, the varied examples he quotes from the past are valuable.

In twenty-eight chapters the author adequately covers the entire subject, commencing with the history of the introduction of the Sweet Pea to England, up to the growing of modern flowers for the show bench. Many of his views in the chapter on varieties will not be acceptable, however, to to-day's *cognoscenti*, but there has been during the last half-century wide differences of opinion on the subject of varieties and, no doubt, the author is prepared to stand by his guns, despite the comments of his contemporaries. It is unfortunate that he has perpetuated the old-fashioned and wrongly used "Layering" for "taking down" cordon-grown Sweet Peas. When a second edition is called for, as it will certainly be, opportunity should be taken to correct certain mistakes, e.g., page 149, "HETP . . . is sometimes used at the rate of 1,000 to 2,000 parts per gallon". This, of course, should read "1 part in 1,000 or 2,000" but in fact, with the modern product now being sold growers find a dilution of 1 in 4,000 sufficient and safe. The volume is well illustrated, with many full pages of photographs, in addition to line drawings, and is indexed. The book can be recommended both to the novice and the more experienced grower.

R. G. E. WILLISON

"Successful Rose Growing." By A. Norman. 183 pp. 163 half-tone illustrations. (W. H. & L. Collingridge, Ltd.) 15s.

An amateur in the very best sense of the word, Mr. Norman has produced a book about Roses from his very great personal and practical knowledge acquired not only in the growing of them but in the actual raising of new varieties, for in 'Ena Harkness' and 'Frensham,' Mr. Norman has the distinction of having given to the Rose world two of the best and most popular Roses in their respective classes which we have at the present time.

Every problem which has arisen in the cultivation of the Rose has been searched out and settled to his own satisfaction. The sciences of horticulture are less to him than his own empirical experience; consequently this is a book which those untrained in science, and that goes for the great majority, can read with understanding and complete content. Every aspect of this fascinating hobby is dealt with in a way which should lead the reader indeed to "Successful Rose Growing." I wish perhaps that more space had been given to the routine of cultivation rather than to the exhibiting at Shows, for less than one in every hundred of keen Rose lovers ever want to exhibit; not that that should not be encouraged, for to put Roses on the Show bench, it is certainly essential to grow them well and successfully.

Some of the writing might be a little clearer. I had to read the context more than once before I understood that the colour of 'Grandmère Jenny' was not being likened to 'Charles Mallerin,' and it is a pity that a number of the names of foreign varieties are wrongly spelt. I am sorry also that the old spectre of the rust of Laxa stock being commutable to the scions is raised again, for surely this species of rust is of a different variety to *Phragmidium mucronatum* (Pers.) Schlecht., and I have *never* known it to affect the cultivated garden Rose.

These are details of perhaps less importance however in this book, which I can thoroughly recommend for the guidance and help of those growers of Roses in the innumerable smaller gardens of this England of flower lovers to whom the Rose is "The Queen of Flowers."

BERTRAM PARK

ORDERS FOR BOOKS

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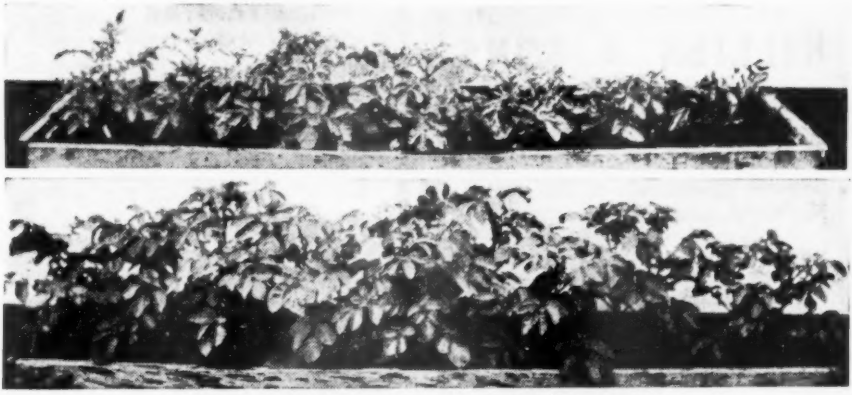
plants need—MANGANESE

Potatoes are susceptible to manganese deficiency. Pale chlorotic areas appear between the veins of the upper leaves. A characteristic brown spotting develops, mainly along the veins. Growth may be seriously affected.



Above: Insufficient manganese. Below: enough manganese.

(J. R. Neller, Florida Agricultural Experimental Station).

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Information and a descriptive leaflet about manganese deficiencies may be obtained from our Agricultural Department.

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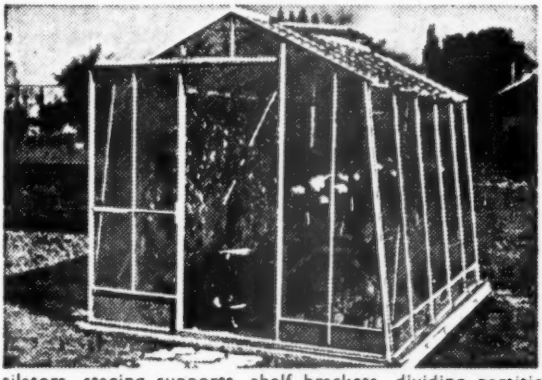

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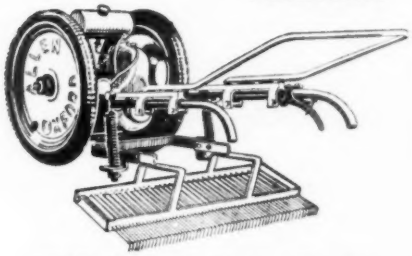

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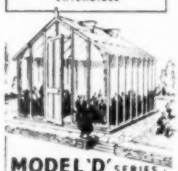

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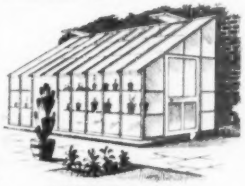

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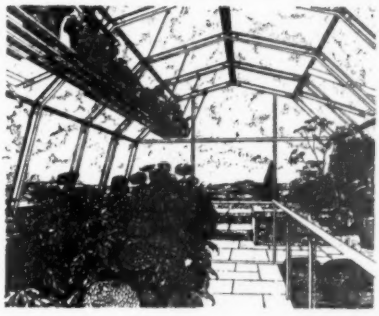

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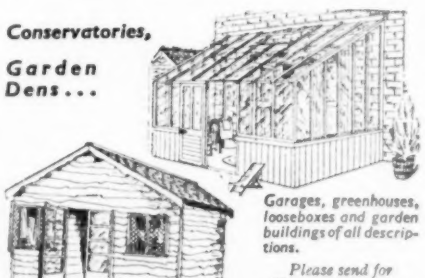

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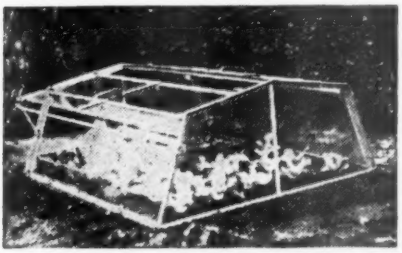

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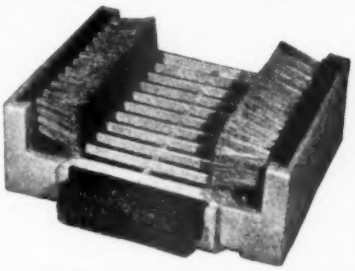

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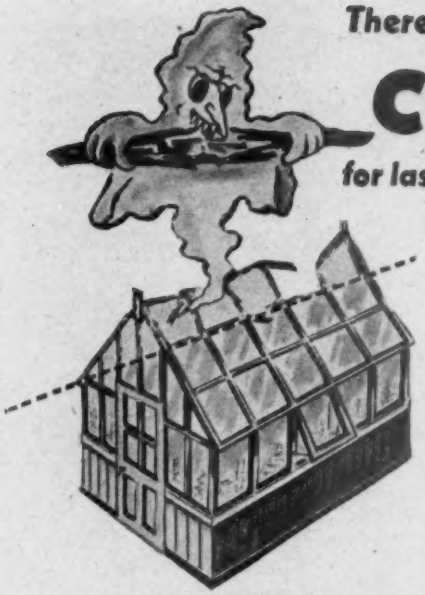

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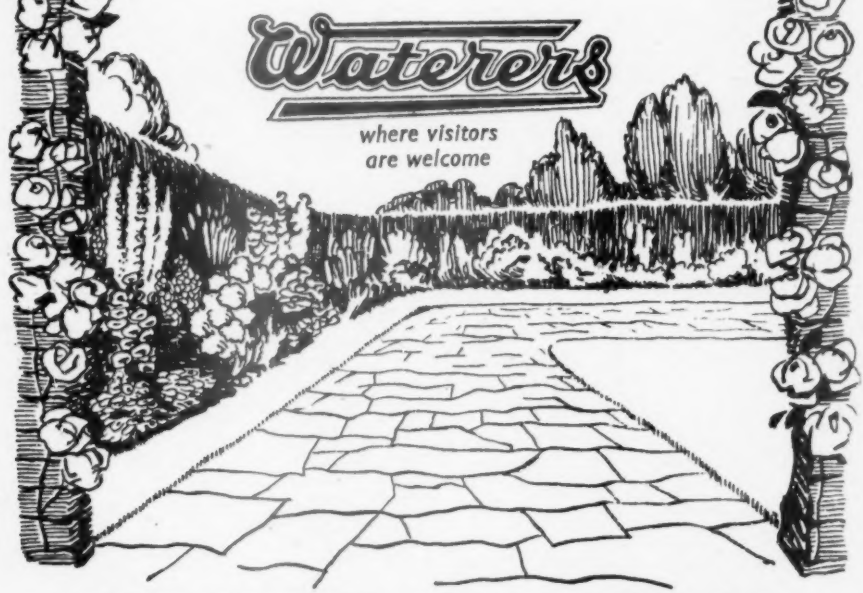

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